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OF

PLANTS

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CONTENTS

Part 1

APRIL 25, 1935

PLATE		PAGE
609	Malachodendron pentagynum grandiflorum	1
610	Dianthus Knappii	3
611	Aglaonema modestum	5
612	Lupinus citrinus	7
613	Spiraea nipponica tosaensis	9
614	Triteleia Bridgesii	11
615	Mauchia hirtella	13
616	Costus Tappenbeckianus	15

Part 2

NOVEMBER 28, 1935

617	Azalea arborescens	17
618	Billbergia macrocalyx	19
619	Spiranthes odorata	21
620	Boltonia latisquama	23
621	Callistemon speciosus	25
622	Calochortus albus	27
623	Silene virginica	29
624	Robinia ambigua	31

Part 3

JULY 10, 1936

625	Billbergia pyramidalis	33
626	Helianthus tomentosus	35
627	Daphne Genkwa	37
628	Costus Malorteanus	39
629	Lupinus nanus	41
630	Begonia socotrana	43
631	Cyrilla arida	45
632	Vriesia Duvaliana	47

Part 4

NOVEMBER 30, 1936

633 Kalanchoë Aliciae 49
634 Carapa procera 51
635 Helianthus angustifolius 53
636 Ferraria undulata 55
637 Crassula perfoliata 57
638 Napoleona Miersii 59
639 Aster spectabilis 61
640 Stifftia chrysantha 63
Index 65

MALACHODENDRON PENTAGYNUM GRANDIFLORUM

(Plate 609)

MALACHODENDRON PENTAGYNUM GRANDIFLORUM

Purple-stamened mountain camellia

Native of the southern Appalachian region

Family TERNSTROEMIACEAE — TEA Family

Stuartia pentagyna grandiflora Bean. Trees & Shrubs hardy in the British Isles. 555. 1915.
***Malachodendron pentagynum grandiflorum* nov. comb.**

Some of the most beautiful of flowering shrubs belong to the Tea family, which has members in the warm and tropical regions of both hemispheres. In Asia and North America alike, the genera and species of the Ternstroemiaceae are apparently more numerous on the eastern side of the land-masses, a situation that exists also in other botanical families, indicating a close relationship between the plants as well as the geological history and present climate of these two regions.

Few members of the Tea family are hardy in the north temperate regions. *Stuartia Malachodendron* has been raised as far north as Long Island, but *Franklinia Alatamaha* and *Malachodendron pentagynum,* especially the variety *grandiflora,* have proved even more hardy and have been raised somewhat further north.

Malachodendron pentagynum has been known in cultivation since about 1785, but is only occasionally seen now. It is not known how long the variety *grandiflora* has been used in gardens. It was first recorded in 1906 from cultivated plants in Pennsylvania, but it was not given a varietal name until 1915. W. J. Bean, who named the variety, describes the flowers as having purple stamens and being larger than the typical yellow-stamened form. More careful checking, however, shows both forms to have the same size of flower in wild specimens, and the "purple-stamened" form to have only the filaments purple, the anthers being yellow.

There has been some controversy over the inclusion of the present subject in the genus *Stuartia,* but all other species of this genus have a five-lobed capitate stigma with the styles united while this has the styles completely free. The writer, therefore, prefers to hold this species out as a monotypic genus.

Various records all point to the variety *grandiflora* as having come from northern Georgia, locality doubtful. Recently, the writer saw a colony in northeastern Georgia wherein the variety

and the typical form grew together on an open slope in the woods near large colonies of *Rhododendron maximum*. The *Malachodendron* formed well-rounded trees twelve to fifteen feet tall, with single trunks three to four inches in diameter. This locality is possibly the source of the cultivated plants.

While usually classed as a mountain plant, this species occurs around the foothills, there being no record from much over two thousand feet elevation. It is most plentiful in the Cumberland Mountain region of Tennessee, but ranges into eastern Kentucky, eastern Virginia (its only recorded occurrence on the Coastal Plain), the Piedmont of North Carolina, and in the lower sections of the mountains in southwestern North Carolina and northern Georgia and Alabama.

The name *Malachodendron* is from the Greek, meaning Mallow-tree.

The "purple-stamened" variety of the mountain camellia is a shrub or small tree up to fifteen feet tall, the trunk and branches clothed with close-fitting, dark brown bark, which becomes slightly shreddy on the older portions. The tree when well matured, has a graceful, round-oval outline, the branching rather open. The leaves are two to six inches long; the petioles one-fourth to one-half inch long, silky-hairy as are the young twigs, which are usually red. The leaf-blade is broadly elliptic, acuminate at the tip, broadly tapering at the base, deep, bright green, frequently reddish along the edges, irregularly serrate, glabrous above, sparingly silk-pubescent beneath, especially when young. The winter buds are densely coated with silk hairs. The flowers are creamy white, three to four and one-half inches across, sessile from the leaf-axils of the year's growth. The sepals are silky-pubescent, usually six in number, one much smaller than the other five, ovate-lanceolate, the tips rounded. The five petals are erose-margined, four slightly different in size, imbricate in the bud, and all covered by the one much smaller outer petal, which is silky pubescent without. The stamens are numerous, the filaments bright purple, the anthers yellow, opening introrsely. The gynoecium consists of five comparatively slender free styles with small stigmatic tips and five carpels united into a silky-pubescent, ovoid body, the ovules two in each cell. The fruit is a woody five valved capsule, the main body globose-ovoid, tapering upward into a stout beak tipped with the persistent styles. The seeds are golden-brown, flat, about one-quarter inch in diameter, with a narrow wing-like margin.

E. J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—A flowering branch. Fig. 2.—The calyx. Fig. 3.—Stamens × 3. Fig. 4.—The gynoecium × 1½. Fig. 5.—A ripe capsule. Fig. 6.—A seed × 1½.

3

2

M. Sorensen.

DIANTHUS KNAPPII

(Plate 610)

DIANTHUS KNAPPII

Yellow Dianthus

Native of Hungary and Jugoslavia

Family CARYOPHYLLACEAE — PINK Family

Dianthus liburnicus var. *Knappii* Pantocsek Oesterr. Bot. Zeitsch. 23: 4. 1873.
Dianthus Knappii Aschers. & Kan.; Pantocsek Oesterr. Bot. Zeitsch. as syn. 1873.
Dianthus Knappii Aschers. & Kan.: Borbás Verh. Bot. Ber. Brand. 19: Abh. 10. 1877.

Many fine garden plants are included in the genus *Dianthus* and most of these are of particular value for providing summer bloom in the rock garden. Especially noteworthy is the subject of the present plate for, so far can be ascertained, it is the only yellow-flowered species in cultivation in North America. For this reason it provides a pleasant relief from the prevailing red, pink, or white flowers of other cultivated *Dianthi.*

Dianthus Knappii is one of the latest blooming members of the genus. With some growers it has earned a reputation for "miffiness"—for failing to thrive and for dying out in an unaccountable manner at times—but the plants at The New York Botanical Garden have shown no evidence of distress and have grown well and flowered freely in a well drained soil and a fully exposed position. It may be that the plants grown here represent a robust form of the species, but observation and previous experience make it seem more likely that the provision of suitable soil and planting site are the determining factors in achieving success with this plant. The soil should be open and gritty in character, and although the addition of lime in the form of old plaster rubble or limestone chippings is appreciated this is by no means essential.

As with all other perennial *Dianthi,* the best results are obtained only by frequent propagation and replacement of the old plants by younger individuals. *Dianthus Knappii* is notoriously shy at producing growths suitable for cuttings and for this reason it is often impossible to maintain a stock by vegetative propagation, but seeds are produced freely and these form a ready means of increase; indeed, in a garden where weeding and cultivation do not receive too careful attention, self-sown seedlings will often appear in abundance.

The yellow dianthus is a perennial herb, arising from the crown of a cluster of fibrous roots. The stems are somewhat glaucous

over a light green ground, eight to twelve inches tall, in great numbers from the basal rosettes. The leaves are a bit more glaucous than the stem, rather weak in texture, linear, one to three inches long near the base, becoming shorter above. The flowers are borne in a large terminal cluster, usually with a few long-peduncled, smaller clusters from the upper leaf-axils. The larger heads are eight to ten flowered, each calyx subtended by an involucel of five broadly lanceolate, acuminate bracts scarious below, green above. The calyx is markedly ribbed, with a dark spot at the top of the tube between the lobes; the lobes are scarious, yellow-brown, subulate. The petals are long-clawed, the claw pale, the blade varying from wedge-shaped to obovate, erose-lacerate at the apical margin, brilliant lemon-yellow, often with a single median brown spot, and usually with a few reddish-brown hairs near the base of the blade. The exserted anthers are brown-lilac. The style is long exserted, the stigma two-cleft.

T. H. EVERETT.

EXPLANATION OF PLATE. Fig. 1.—Two flowering stems. Fig. 2.—The involucel, calyx and stigmas × 3. Fig. 3.—A petal × 2.

AGLAONEMA MODESTUM

(Plate 611)

AGLAONEMA MODESTUM

Aglaonema

Native of southeastern China

Family ARACEAE — ARUM Family

Aglaonema modestum Schott; Engl. DC. Monog. Phan. 2: 442. 1879; Engl. Pflanzenreich 64 (IV–23Dc): 29. *fig. 13.* 1915; Arac. Exsic. nos. 74, 258; Merr. Journ. N. Y. Bot. Gard. 33: 93. *fig. 1.* 1932.
Aglaonema acutispathum N. E. Br. Gard. Chron. n. ser. 24: 39. 1885.
Aglaonema simplex L. H. Bailey Hortus 31. 1930, not of Blume.

Those who are interested in plants that will withstand the adverse conditions characteristic of our modern houses and apartments under city conditions should be familiar with the commonly cultivated Aglaonema, or so-called Chinese evergreen. It was introduced into England from China between 1880 and 1885, but just when it was first introduced into the United States is not recorded, although it is suspected that this was about 1900. In any case, the plant is now an exceedingly popular one among apartment dwellers, because it will thrive for an indefinite period when the stems are cut and placed in water; and it is in this form that it is chiefly sold and cultivated, although it is also used for decorative effect in terraria. When grown in water the plants are naturally not as vigorous as when grown in soil, producing fewer and smaller leaves and rarely or never flowering, but better growth is obtained by adding a little charcoal to the water. When grown in conservatories in rich soil the plants are much more luxuriant and flower freely.

The genus *Aglaonema* is a characteristic one of tropical Asia, about 41 species now being recognized, extending from the Khasia Mountains in India to southeastern China southward to Malaysia and the Philippines. Most of the species grow in nature in damp shaded ravines or in wet soil near streams or among boulders on steep forested slopes. Like many cultivated plants, the original home of this species was obscure, and again, like so many plants described from cultivated specimens, the fact was overlooked in 1885 when it was renamed and redescribed, that six years previously it had been characterized under another name from herbarium specimens. The original specimens were supposed to have been collected by Gaudichaud in the Philippines, but if this be so, Gaudichaud's specimens must have been taken from cultivated plants.

It is more probable that Gaudichaud secured his specimens in Macao. It may be that the species occurs in China now only in cultivation, but it is apparent that the Chinese have cultivated it for a very long time. It is suspected that its introduction into the United States and its dissemination here were probably due to the Chinese themselves, because of their knowledge of the plant and the ease with which it could be transplanted, propagated, and grown.

The stems are tufted, several in a clump, unbranched, glabrous, up to fifty centimeters high, usually about one and one-half centimeters in diameter; the petiolar scars distinct, one to two and one-half centimeters apart. The leaves are uniformly green, shining, slightly paler beneath: the blades are oblong-ovate, slightly inequilateral, fourteen to twenty-five centimeters long, five to twelve centimeters wide, the base obtuse to rounded, sometimes very broadly acute, the apex conspicuously and sharply acuminate, the acumen two to three centimeters long, slightly falcate, the primary lateral nerves five to eight on each side of the midrib, curved-ascending: the petioles are green, about as long as the leaves, the lower one-half conspicuously sheathing. The inflorescences are terminal, solitary or sometimes in pairs, one developing before the other, the peduncles up to ten centimeters long. The spathes are oblong-elliptic, open, slightly concave, about eight centimeters long and three and one-half centimeters wide, oblong-elliptic, shortly acuminate, pale greenish or greenish-white, erect. The spadix is about six centimeters long, the lower part bearing up to fifteen pale-greenish pistillate flowers, these reduced to naked, ovoid, green, sessile ovaries: the truncate stigmas are brown, about one millimeter in diameter: the terminal part of the spadix is cylindric, obtuse, white, about five centimeters long and seven centimeters in diameter, composed of numerous sessile densely crowded anthers. The fruit is unknown.

E. D. MERRILL.

EXPLANATION OF PLATE. Fig. 1.—A flowering stem × 2/5. Fig. 2.—Spathe and infloresence nat. size.

LUPINUS CITRINUS

(Plate 612)

LUPINUS CITRINUS

Dwarf yellow lupine

Native of California

Family FABACEAE — PEA Family

Lupinus citrinus Kellogg. Proceedings Calif. Acad. Sci. 7: 93. 1876.

Many and varied are the forms presented by the lupines, running through nearly all colors and forms of growth. The greatest number of species in any one region occur in the western United States, where hillsides and valleys are made radiant in spring and summer with their sheets of color. Both annual and perennial sorts are of equal popularity and form handsome additions to our gardens. The yellow-flowered species are perhaps not so numerous as are the blue ones, but are equally attractive and desirable.

Our present subject is one of the lower-growing annuals, its soft, white-hairy leaves making a pleasing contrast with the yellow flowers.

This species was discovered in 1876 by Dr. Gustave Eisen, well known for his studies on figs and raisins. His collections were placed in the hands of Dr. Kellogg for determination, and a number of new species were described from them.

Lupinus citrinus, whose flowers are entirely golden-yellow, is known in the wild state only from Fresno County, California, where it grows in the foothills of the Sierra Nevada. It usually is in company with *L. Stiversii,* which has bicolored flowers, the standard pale yellow, the wings and keel dull rose, and the leaves less hairy than are those of *L. citrinus.*

The annual lupines are easily raised in any well-drained soil, but the seed should be sown where they are to remain, as they do not take kindly to transplanting.

The name *Lupinus* is from the Latin for wolf, in allusion to an old fancy that the plants preyed on the soil in which they grew.

The dwarf yellow lupine is an annual herb, four to eight inches tall, the entire plant except the corolla clothed with short, soft, spreading hairs, the stem usually few-branched both from the base and above. The palmately parted leaves consist of six to eight

oblanceolate leaflets; the stipules are narrowly lanceolate, translucent. The inflorescences, terminating all the branches, are two to four inches long, moderately dense-flowered. The lanceolate bracts are about the same length as the pedicels, and translucent. The flowers are spreading in anthesis, soon recurving. The calyx is about one-quarter inch long. The corolla is golden-yellow, three-eighths inch long; the standard with dark spots near the center base; the keel nearly straight, ciliate near the claws on the lower edges. The ten stamens are monadelphous, the alternating anthers of two different forms. The legume is deflexed, glabrate, two- to four-seeded, the seeds pale with black spots.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—A flowering plant. Fig. 2.—Standard. Fig. 3.—A wing. Fig. 4.—The keel. Fig. 5.—The androecium × 3. Fig. 6.—Calyx and gynoecium × 3. Fig. 7.—The ripe legume.

SPIRAEA NIPPONICA TOSAENSIS

(Plate 613)

SPIRAEA NIPPONICA TOSAENSIS

Tosa-shimotsuke—Tosa-Spiraea

Native of Japan, island of Shikoku, Province of Tosa

Family ROSACEAE — Rose Family

Spiraea tosaensis Yatabe, Bot. Mag. Tokyo **6**: 6. 1892.
Spiraea bracteata var. *tosaensis* Makino, Bot. Mag. Tokyo **13**: 111. 1899.
Spiraea nipponica var. *tosaensis* Makino, Bot. Mag. Tokyo **20**: 28. 1906.

This interesting and handsome shrub, which seems to occur wild only in a restricted region on the island of Shikoku, has been introduced into western gardens during the last few years. Reaching usually not more than three to five feet in height, it is of lower stature than *S. nipponica,* and its narrow leaves render it quite distinct. Its flowers are cream-colored and not quite as clear white as might be desired from an ornamental point of view, but they are set off to advantage by the purple-colored young shoots and stems. The shrub in full bloom is so graceful and pretty that its garden merit can not be denied, and in time it may become as much of a favorite as *S. nipponica* itself. The winter of 1933–34, which was one of the severest ever recorded in New York, proved that this variety is quite as hardy as the species *S. nipponica.*

The type locality for this shrub is on the bank of the river Watari-gawa in the Province of Tosa. The Japanese living there know it under the name "Mojihagi."

The Tosa Spiraea forms a much-branched shrub three to five feet tall. Its branches at first are brown, then grayish brown, later gray. The branchlets are slender, angular, and glabrous. The young shoots of the current season are purplish. The leaves are short-petioled, narrowly oblong-obovate to oblanceolate, glabrous, glaucous beneath, dull green above, one to four centimeters long, and three to eight millimeters broad; their margins are entire, but three to five teeth are usually to be found at the obtuse or rounded apex. The flowers, which are somewhat smaller than those of *S. nipponica,* are produced in five- to twenty-flowered corymbs which terminate the leafy branchlets. Their disks are greenish yellow.

HENRY TEUSCHER.

EXPLANATION OF PLATE. Fig. 1.—A flowering branch. Fig. 2.—A flower × 4. Fig. 3.—Calyx and gynoecium × 4. Fig. 4.—A leaf.

TRITELEIA BRIDGESII

(Plate 614)

TRITELEIA BRIDGESII

Bridges' Brodiaea

Native of Northwestern U. S.

Family ALLIACEAE — ONION Family

Brodiaea Bridgesii S. Wats. Proc. Am. Acad. 14: 237. 1879.
Triteleia Bridgesii Greene, Bull. Calif. Acad. 2: 141. 1886.

Members of the genus *Triteleia* and its sister genus *Brodiaea* are among the many showy bulbous plants which California has contributed to horticulture. In the East, their chief value lies in their use in rock gardens, where loose, gravelly soil and more perfect drainage can be given them. In the wild state, their choice of habitat is variable, some growing on grassy slopes and meadows, some in the drier or stony regions, or in chaparral country. Our present subject is one which chooses the last-mentioned habitat. It is one of the more deeply colored species and an addition to any rock garden, where, when well settled plants throw up their flower scapes, each bearing up to fifty reddish-purple flowers, a colony is a desirable splash of color.

Triteleia Bridgesii was described as a *Brodiaea* in 1879 from plants collected by Robert Bridges in Central California.

The genus *Brodiaea* has at various times been split into several genera, reunited as one, and split and united again, so that several combinations appear for most of the species. At present, it seems advisable that the group with six perfect stamens with naked filaments and stipitate ovary be kept as a separate genus—*Triteleia*.

In its natural range it is now known from southern Oregon southward to Mariposa County, California, growing in open woods and chaparral in heavy soil.

The name *Triteleia* is from the Greek, referring to the perfect ternary arrangement of the floral parts.

Bridges' brodiaea is a scapose herb arising from a fibrous-coated corm. The leaves vary in length from slightly shorter than the scape to exceeding it in length, and become rather weak with age. They are strap-shaped, one-eighth to three-quarters inch wide, rather thin and flat, usually three or four in number, all basal. The scape is scabrous, twelve to twenty-four inches tall, slightly glaucous, terete. The translucent, somewhat scarious bracts are three-eighths to one-half inch long, the two outer larger than the inner ones, each subtending a pedicel. The inflorescence consists

of three to fifty flowers in an umbel on pedicels one to two and one-half inches long. The perianth is funnel-form, one to one and one-quarter inches long, the tube abruptly long-attenuate below, all bright purple with darker veins. The perianth lobes are about three-eighths inch long, bluntly apiculate, ovate-lanceolate. The six stamens are inserted in the throat in one row, the filaments naked, dilated downward. The ovary is light violet, borne on a slender stipe one-half to five-eighths inch long, the stigma capitate. The capsule is ovoid, one-quarter inch long, dehiscent, the numerous seeds black.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—A flowering plant and bulb. Fig. 2.—A portion of the perianth and 2 stamens. Fig. 3.—The gynoecium × 2. Fig. 4.—A ripe capsule. Fig. 5.—A seed × 2.

PLATE 615

ADDISONIA

MAUCHIA HIRTELLA

(Plate 615)

MAUCHIA HIRTELLA

Native of Louisiana and Texas

Family CARDUACEAE — THISTLE Family

Bradburya hirtella T. & G. Pl. N. A. 2: 250. 18.
Mauchia hirtella Kuntze, Rev. Gen. Pl. 352. 1891.

In the early thirties of the past century, Thomas Drummond collected extensively in Texas and discovered many plant-novelties which have permanently connected his name with the botany of the state. The plant here illustrated is one of his discoveries. Later it was found by the celebrated plant collectors Charles Wright and Ferdinand Lindheimer. The plant is evidently rather widely distributed, but it is seldom collected. In gross aspect it resembles a slender golden-aster, but its technical characters are very different.

Recently it was found by Mary Debaillon in southwestern Louisiana along the Southern Pacific Railroad lines, evidently naturalized from Texas.

Plants begin to bloom when about three inches high, continuing throughout the season, as they grow taller, until frost. The seeds germinate in the late summer or fall. Though normally biennial, if cut back before too many fruits form, the plants will grow on into the third season; very dry weather in early fall or late summer also seems to have the effect of arresting them and causing them to continue as perennials. If the plants are kept thinned they become quite floriferous—but if the seedlings are allowed to remain in thick patches the plants are spindly and bloom sparingly. Mauchia grows in a floriferous environment. Its associates are skullcaps, bluets, herbertia, dayflowers, Mexican primroses, flaxes, rain-lilies, morning-glories, poppy-mallows—many, many others.

The plants grow equally well in the native sandy-clay soil and on gravelly roadbeds, the only requisite being comparative freedom from such matted grasses as Bermuda and pasture grass.

The illustration was made from plants which have been growing under glass at the Garden for several years.

Mauchia is a biennial or perennial woody plant with a hard root producing many filiform fibres. The stem, up to two and a half feet tall, is simple or branched at the base, sparingly or diffusely

branched above, closely but minutely pubescent. The leaves are numerous, alternate, often rather close together, ascending or spreading and somewhat recurved. The blades are linear-spatulate, up to an inch long, deep-green, abruptly pointed and often tipped with a cilium, very minutely pubescent and remotely long-ciliate. The heads are radiate, erect, solitary on peduncles terminating branches. The peduncle is slender-wiry, minutely pubescent and bearing one or few subulate appressed scales. The involucre is campanulate, about a half inch high. The bracts are numerous, appressed, of many lengths, the outer lanceolate, the inner linear, all scarious-margined, acuminate, pubescent on the bright-green midrib and minutely ciliate, ultimately reflexed. The ray is three-quarters of an inch to an inch broad, flat, fruit-producing. The ligules are clear-yellow, mostly 12 to 16, narrowly elliptic, revolute at anthesis, involute when spent, mostly 3-toothed at the apex. The disk is flat, yellow, about 40-flowered, the flowers sterile, corolla about one-half inch long. The limb is slightly longer than the tube. The lobes are ovate, yellow. The achenes are obovoid, ribbed, strigose. The pappus consists of rough capillary bristles.

JOHN K. SMALL.

MARY S. DEBAILLON.

EXPLANATION OF PLATE. Fig. 1.—Two flowering sprays. Fig. 2.—A ray floret × 3. Fig. 3.—A disk floret × 3. Fig. 4.—The involucre × 1½. Fig. 5.—The open involucre, showing the receptacle × 3. Fig. 6.—The root.

COSTUS TAPPENBECKIANUS

(Plate 616)

COSTUS TAPPENBECKIANUS

Tappenbeck's spiral-flag

Native of the Kamerun

Family ZINGIBERACEAE — GINGER Family

Costus Tappenbeckianus Joh. Braun et K. Schum. Mitteil. Deutsch. Schutzgeb. 2: 152. 1889.

Members of the genus *Costus* are not commonly met in cultivation, at least in temperate regions, although their richly colored foliage and showy flowers render them attractive subjects for the embellishment of a greenhouse wherein conditions suitable for the growing of tropical plants are maintained. In such an environment they grow luxuriantly and make no special demands upon the skill of the cultivator. They appreciate a rich but sandy soil containing an abundance of leafmold and a small proportion of peat-moss. As is the case with most greenhouse plants demanding moist soil conditions, the receptacles in which they are accommodated must be provided with an ample quantity of drainage material. A humid atmosphere and shade from bright sunshine are necessary for satisfactory growth. In order to obtain finely developed specimens a liberal feeding policy should be initiated when the pots are well filled with roots.

Propagation may be effected by division of the rootstock, but a more rapid increase is obtained by cutting the stems into pieces each an inch or so long and placing these in a mixture of peat-moss and sand in a propagating case where strong bottom heat is available.

Our present subject is one of the rarely seen species in cultivation, and apparently rare even in the wild, as few herbarium specimens are in existence. It was discovered by Johann Braun in 1888 in moist woods along small streams near the coast at Great Batanga in the Kamerun, and live plants were taken to Berlin where it flowered in April of the following year. The plants in the conservatory at The New York Botanical Garden, which were obtained from the Botanical Gardens in Berlin in 1902 have flowered freely each March for several years.

Since the more frequently seen species of *Costus* have their inflorescence terminating a leafy stem, this one usually attracts attention by its separate flower-spikes, which are borne rather profusely.

C. Tappenbeckianus is also interesting in being the only terrestrial member of an epiphytic group within the genus *Costus*.

The common name of spiral-flag was given in reference to the spiral arrangement of the leaves up the stem, which is itself spiral in this species.

Tappenbeck's spiral-flag is a terrestrial, perennial plant. The leafy stems are twelve to sixteen inches tall. The leaves are nearly sessile or very short-petioled, obovate, acute, vivid, deep green and shining above, a little paler beneath, subfleshy, short pubescent on both surfaces, three to five inches long and one and one-half to three inches wide; the sheath pilose, completely concealing the stem, the short ligules truncate. The inflorescence is borne on a separate spike from the rootstock. The peduncle is one-half to one inch long, with sheathing bracts: the flower-spike is ellipsoid, about an inch long, four to six flowered, the bracts broadly elliptic, chartaceous, dark reddish brown. The calyx is about three-eighths inch long, the three lobes united into a cup-like body, the tips only free. The corolla tube is white, the two lateral petals whitish, flushed pale pink, lanceolate and acute, one and three-quarters inch long, the lip two and one-half inches long, pale below, the upper portion light rose with a double yellow median blotch, the apex irregularly three-lobed, the margins irregular. The stamen is about an inch long, the connective recurved at the tip, pale pinkish, the tip deeper colored, acute, denticulate. The style is filiform, about one inch long; the stigma two-lobed, the shorter lobe apically notched, the longer fan-like, grooved; the ovary inferior, three-loculed. Fruit not seen.

E. J. ALEXANDER.
T. H. EVERETT.

EXPLANATION OF PLATE. Fig. 1.—A stem and 2 inflorescences. Fig. 2.—The lip, spread out. Fig. 3.—A lateral petal. Fig. 4.—The dorsal petals. Fig. 5.—The stamen. Fig. 6.—The gynoecium and calyx.

AZALEA ARBORESCENS

(Plate 617)

AZALEA ARBORESCENS

Tree Azalea

Native of the southern Appalachians

Family ERICACEAE — HEATH Family

Azalea arborescens Pursh, Fl. Am. Sept. 152. 1814.
Rhododendron arborescens Torr. Fl. N. & Mid. U. S. 425. 1824.

Our native Azaleas, other than *A. calendulacea,* are a much-neglected source of summer-flowering shrubs, the present subject being one of the best, both for attractiveness of foliage and flower, and for fragrance of flower and leaf. The delightful spicy odor of the flowers, and the coumarin or vanilla-like scent of the drying leaves, as well as the clean, disease-free soft-green foliage are desirable items in shrubbery plantings.

This species is best grown in light shade, where the flowers tend to be a pure, waxy white, in striking contrast to the widely spreading red stamens and pistil. Our accompanying plate was made from a painting of a plant grown in full sun, showing the characteristic pink tinge which is present under such conditions.

While perfectly hardy in the north, the species is native in the Appalachian mountain system from southern Pennsylvania to Georgia, reaching its best development on rocky mountain slopes in North Carolina and Tennessee, where it frequently grows in great drifts on whole mountain-slopes. In one case, on Wayah Bald mountain in North Carolina, at an elevation of five thousand five hundred feet, it covers the entire top of the mountain with only occasional interspersing of other shrubs. It is always easily distinguishable from the other American Azaleas by the long-exserted and widely spreading red stamens, the large, white, spicy flowers, the scent of the drying leaves, and the completely glabrous young twigs.

The tree Azalea is a much-branched shrub up to nine feet tall, rarely eighteen feet, the stems and older branches clothed with fine, closely fitting, gray-brown to blackish-brown bark. The young twigs are glabrous from the first, yellow-brown to red-brown with a slight bloom. The winter buds are glabrous. The leaf-blades are short-petioled, obovate to elliptic or oblanceolate, two to three and one half inches long, obtuse or acutish, bright green above, glaucous or greenish beneath, glabrous except for the ciliate margin and scattered hairs on the midrib beneath, coumarin-scented when

dry. The flowers are borne after the leaves are mature, three to six in a cluster, the pedicels glandular-hairy or occasionally glabrate. The sepals are very small, glandular-ciliate. The corolla is white, often flushed with pink, glandular-hirsute on the outside of the tube and on the midrib of the lobes: the tube one to one and a half inches long, slightly dilated above; the lobes ovate and spreading. The stamens are five in number; the exserted portion of the filaments red, the included portion densely pubescent; the anthers brown-orange. The stigma is capitate, brown-red; the style slender and usually glabrous, the exserted part red; the ovary oblong-ellipsoid, glandular setose. The capsule is oblong-ovoid, one-half to one-third inch long, somewhat glandular. The seeds are light brownish, chaff-like.

E. J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—A flowering branch. Fig. 2.—A stamen. Fig. 3.—The gynoecium. Fig. 4.—A late summer leaf, showing mature size.

BILLBERGIA MACROCALYX

(Plate 618)

BILLBERGIA MACROCALYX

Large-calyxed Billbergia

Native of Brazil

Family BROMELIACEAE PINEAPPLE Family

Billbergia macrocalyx Hook. Bot. Mag. pl. 5114. 1859.

Members of the strictly American Pineapple family offer some of the most startling color contrasts in nature in their inflorescence and its surrounding bracts. The genus *Billbergia* is one of the most brilliant of these, its flowers being mostly shades of green or blue, or both, which make a striking contrast with the red or pink bracts and flower stalk. Our present subject is a typical one of these, and can be depended upon to flower frequently once it is well settled into growth.

Since most of the members of this family are epiphytes they make rather interesting and attractive house-plants, needing only to have water poured into the funnel-like hollow formed by the leaf bases to keep them in good condition, but their price is rather prohibitive, so that they are rarely seen outside of collections. They of course do best under moist greenhouse conditions, shaded from the afternoon sun, and develop their brightest coloring potted in a mixture of fern-roots and sphagnum. Individual plants usually die after flowering, but the majority send out basal shoots before doing so, and these continue the plant's existence, the process being repeated by each plant that attains the flowering stage.

Our present subject is a native of Brazil.

The large-calyxed *Billbergia* is an epiphytic plant, with the leaves in a closely set rosette with the bases cupped, forming a cylindrical hollow within. The leaves are dark-green with irregularly scattered yellowish spots, and transverse whitish bands on the back, one foot to a foot and a half long, broadly ligulate, canaliculately concave, swollen and inflated at the amplexicaul base, recurved at the acute or short-acuminate apex, the margin remotely spinulose-serrate. The inflorescence is a simple, thyrsiform spike, with several large, slightly concave, deep rose-colored, ovate-lanceolate bracts. The scape and pedicels are dull red, but so covered with a farinose tomentum as to appear pinkish-white. The three sepals are narrowly oblong, roseate below and greenish above, the hypanthium purplish-rose, the whole covered with the same farinose tomentum. The three petals are ligulate, yellow-green at center with blue-violet

margins; the petal scales each two-toothed with a fringed appendage at the base. The three stamens are a little shorter than the petals, the filaments white, the anthers bright orange. The long filamentary style is topped with the three stigmatic branches, all three tightly convolute; the inferior ovary is many-ovuled. The fruit is a berry-like capsule, the seeds naked.

E. J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—A petal and attached stamen ×2. Fig. 3.—The gynoecium ×3. Fig. 4.—Upper portion of a leaf. Fig. 5.—Entire plant, much reduced.

SPIRANTHES ODORATA

(Plate 619)

SPIRANTHES ODORATA

Fragrant Ladies'-Tresses

Native of the southeastern United States

Family ORCHIDACEAE — ORCHID Family

Neottia odorata Nutt. Jour. Acad. Phil. **7**: 98. 1834.
Spiranthes odorata Lindl. Gen. & Sp. Orch. 467. 1840.
Gyrostachys odorata Kuntze, Rev. Gen. Pl. 664. 1891.
Ibidium odoratum House, in Muhlenbergia **1**: 128. 1906.

The genus *Spiranthes*, long a complex concept, has finally been interpreted as a quite simple one after the elimination of much extraneous matter. Curiously enough the "splitting" in this case has been generally accepted by taxonomic botanists. There are fifteen species native in North America north of Mexico. The great majority occur in the eastern United States.

The ladies'-tresses form the largest of the simple or natural genera of orchids in northeastern North America, comprising at least nine species in that area. The plant here illustrated has the largest inflorescence and the most fragrant flowers among all the species of the genus. Thomas Nuttall's introductory remarks in publishing the species a century ago as "The largest and finest *Spiranthes* in the United States, possessed also of a very sensible and delicate fragrance," still holds good. This plant, outstanding as it is, has not always received the consideration deserved, largely because its favorite haunts are well off the beaten track. Deep swamps, particularly inaccessible river-swamps, are its usual habitats. The first specimens were collected on the wet and muddy shores of the Neuse River at Newbern, North Carolina, over a century ago.

We were not thoroughly convinced as to the specific validity of this orchid until a living specimen, secured in New Orleans in the spring of 1931, flowered at the Garden in the fall. The species differs from *Spiranthes cernua* in the narrower, lanceolate, long-acuminate bracts which are much elongate near the base of the spike, and which do not enfold the ovary, in the narrowly linear-lanceolate lateral sepals, and in a lacerate-fringed blunt lip. On the contrary, *cernua* has ovate or ovate-lanceolate, abruptly acuminate bracts that enfold the ovary, lanceolate lateral sepals, and an erose-fringed lip. The fragrance is pronounced at all times, but it greatly increases toward evening and continues strong well into the night. The species is confined to the southeastern Coastal Plain from Virginia

to Texas. Plants do well under glass at the north, beginning to flower about the middle of October. A single spike of a robust plant may remain in flower for a period of six to eight weeks.

The flowers of this plant, which are exceptionally large for the genus, contain a great abundance of nectar. Bees are known to aid in the pollination of the flowers in their search for the nectar; while other insects are suspected to be involved, long vigils have failed to catch them in action.

The fragrant ladies'-tresses is one to two feet tall, glabrous nearly up to the inflorescence. The basal leaves are erect or ascending, with linear or narrowly spatulate blades four to thirteen inches long. The stem is erect, stout, arising from a cluster of long, fleshy tuber-like roots, mostly sheathed by the leaf-bases. The stem-leaves are several, with sheathing bases and erect or ascending linear-spatulate, linear, or linear-lanceolate, acute or acuminate blades which are dull on the back and shining on the face. The spike is short-peduncled, three to seven inches long, erect, the flowers mostly three-ranked on the twisted rachis. The bracts are narrowly lanceolate, long-acuminate, especially elongate near the base of the spike. The ovary is bright-green, glandular-pubescent. The perianth is greenish-white or cream-color, nodding, five-eighths to nearly three-fourths of an inch long. The lateral sepals are narrowly linear-lanceolate, inequilateral. The median sepal is similar in shape, but equilateral. The lateral petals are linear, adherent to the median sepal. The lip is strongly curved, but lanceolate in outline, with a pair of knob-like callosities at the base, with the edges lacinate. The column is short. The anther is green and brown-tinged or brown-streaked, acuminate. The stigma is broadly winged, thus rhombic when spread out, broadly tapering to the apex which is at length split after the gland is removed. The pollen-masses are elongate. The capsule is ellipsoid, about a half inch long, ribbed.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering spike, × ¾. Fig. 2.—A lateral sepal, enlarged. Fig. 3.—The median sepals, enlarged. Fig. 4.—A lateral petal, enlarged. Fig. 5.—Lip, enlarged. Fig. 6.—Androecium and gynoecium. Fig. 7.—A basal leaf. Fig. 8.—A plant much reduced.

BOLTONIA LATISQUAMA

(Plate 620)

BOLTONIA LATISQUAMA

"Pink" Boltonia

Native of the west central U. S.

Family CARDUACEAE — THISTLE Family

Boltonia latisquama A. Gray, Am. Journ. Sc. (II) **33**: 238. 1862.

Asters and Aster-like flowers are always high-ranking among fall-flowering garden plants. By far the greatest number of these are American, for the western hemisphere is the home par excellence of the Composite Family. The smaller flowered types are exceedingly useful for drift-planting, and their sprays of bloom, when cut, are excellent for bouquet arrangement, as they lend an airy touch to the heavier types such as dahlias, marigolds, sunflowers and china-asters.

The genus *Boltonia* is closely related to the Asters, having exactly their outward appearance, but differing internally in the pappus, which consists of a ring of small scales accompanied by two to four long bristles, the achene (seed) being much flattened and margined or winged.

The species here illustrated is the more attractive horticulturally, the much taller *B. asteroides,* usually cultivated in its white-flowered form, being too rank and weak-stemmed for any but background or wall plantings. *B. latisquama,* which grows three to four feet tall, has larger, lavender-pink flowers and more sturdy stems.

Boltonias may be grown in any average garden soil in full sun, as in the shade they form weak stems. They are propagated by diviison of the roots, which is best done in the spring.

Boltonia latisquama is native in the central United States, being known in the wild state in Kansas, Oklahoma, and western Missouri, where it grows on the plains.

The genus is named after James Bolton, an Eighteenth Century English botanist.

The "pink" boltonia is a perennial glabrous herb, the three- to five-foot stems arising from a large fibrous clump of roots. The stem is erect, much-branched above, green, covered with a slight glaucescence. The leaves are alternate, oblong to oblanceolate, two to three inches long, entire or the lower sparsely and minutely serrate, sessile. The ones on the branches are much smaller, gradually becoming scale-like. The heads are short-peduncled, terminating

long branchlets, one inch or more across the rays. The involucral bracts are oblong to ovate, obtuse or mucronate, imbricate in several series. The ray-flowers vary in color from pinkish-lavender to blue-violet, and are very numerous. The disk-flowers are light yellow. The achenes are flattened, the pappus of small scales accompanied by two or three prominent awns.

E. J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—A portion of the inflorescence. Fig. 2.—A ray floret ×2. Fig. 3.—A disk floret ×4. Fig. 4.—A lower cauline leaf and portion of main stem.

CALLISTEMON SPECIOSUS

(Plate 621)

CALLISTEMON SPECIOSUS

Showy Bottle-brush

Native of southern Australia

Family MYRTACEAE — MYRTLE Family

Metrosideros speciosa Sims, Bot. Mag. pl. 1761. 1815.
Callistemon speciosus DC. Prod. 3 : 224. 1828.

Among the many unusual plants in our greenhouses which have come to us from Australia, the bottle-brushes are entitled to a prominent place for showiness and long season of flower. The unique form of the flower-spike, which is strikingly similar to a bottle-brush, is responsible for the common name applied to most members of this genus and the sister genus *Melaleuca*.

Numbering about twenty-five or thirty species, these are all native to Australia, where they grow in the rather arid districts, making small trees or shrubs, many with drooping branches. They are striking sights when in flower, the whole tree appearing aglow with what at a distance appears like plumes of color.

They are suitable for outdoor planting in southern California and Florida, where little water is necessary, but elsewhere must be grown in a cool greenhouse with more water. They are propagated with equal ease from seed or from cuttings of ripened wood.

The species are so similar that they may be distinguished only with difficulty; in fact, the genus is not satisfactorily known botanically.

The present species is one of those longest in cultivation, differing from its closely related congener *C. lanceolatus* by the denser spike of flowers and the less distinct veins of the leaves.

The name *Callistemon* is from the Greek, meaning beautiful stamen.

The showy bottle-brush is a large shrub or small tree up to forty feet in height, with erect-spreading or pendulous branches. The leaves are dark-green, lanceolate, firm and glabrous at maturity, two to four inches long and about one-fourth inch wide, the midvein more prominent than the obscure lateral veins, the apex acute or obtuse. The expanding leaves are pale green with pink tinges, soft and flexible, covered with silky white hairs. The inflorescence is a dense spike three to five inches long, and about three inches thick. The small nearly globular calyx has five orbicular sepals. The five orbicular petals are early deciduous. The numerous stamens at-

tached at the top of the calyx-tube, are about one inch long, deep bright red, the anthers versatile, red-brown, the pollen bright yellow. The pubescent ovary is seated in the base of the calyx-tube, the bright red style slender, with a capitate green stigma. The fruit is a hard, woody, ovoid capsule, formed by the fusion of the calyx-tube and ovary, the entire spike of capsules being long-persistent on the plant and not opening until removed and allowed to dry out in warmth, when the many small seeds are expelled.

E. J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—A single flower. Fig. 3.—Gynoecium, showing its position in the calyx.

CALOCHORTUS ALBUS

(Plate 622)

CALOCHORTUS ALBUS

Fairy Lantern

Native of California

Family LILIACEAE — LILY Family

Cyclobothra alba Benth. Trans. Hort. Soc. (II) **1**: 413, pl. 14 f. 3. 1834.
Calochortus albus Dougl.: Benth. Maund & Hensl. Bot. **2**: pl. 48. 1838.
Cyclobothra paniculata Lindl. Bot. Reg. 20 under pl. 1662. 1834.

While the true tulips of our gardens are, in their wild state, confined exclusively to the Old World, the western hemisphere has a different kind of tulip just as exclusively its own. This is the genus Calochortus, confined to North America from the Great Plains westward, reaching its greatest development in the Pacific Coast region. Commonly known as mariposa-tulips, star-tulips and globe-tulips, they are native to a great variety of habitats, from hot arid regions to grassy plains, meadows and shaded woodlands. The shaded woodland types, the globe-tulips and star-tulips, are the most satisfactory for eastern gardens, as they stand more moisture than most others and are more amenable to our climatic conditions, but all must have perfect drainage.

The species considered here is the most variable of the globe-tulip group, this particular form, which inhabits the coast ranges, being called "The Pearl," differing from the ordinary form in its brown shading and slightly more open flowers. There is also a pink-flowered phase. In the wild state this species is native to California, growing in shaded woodlands.

The name *Calochortus* is from the Greek, meaning beautiful grass.

The pearl *Calochortus* is a bulbous plant with a stem one to two feet tall, light green and glaucous, much-branched. The single leaf is basal, lanceolate, nine to fifteen inches long, one-third to one inch wide, green and glaucous, streaked with red-brown below. The leaf-like bracts are lanceolate-acuminate, those subtending branches one to three inches long, those subtending flower-pedicels one-half to one inch long, the same color as the basal leaf. The flowers are subglobose, on slender nodding pedicels. The sepals are ovate-acuminate, one-half to three-quarters of an inch long, tinged and veined with reddish-brown. The petals are pearly white, faintly flushed brown-lilac on the lower portion, concave and strongly arched, obtuse or acutish, an inch to an inch and a half long, the inner face covered with long yellowish hairs above the gland; the gland, which appears as a callosity on the outer side, is a shallow

groove within, lunate, with four transverse scales, fringed with short, close, yellow glandular hairs. The six stamens have white filaments and yellow, basifixed anthers. The three pinkish stigmas are sessile, recurved after anthesis, the ovary narrowly ellipsoidal with many ovules. The fruit is a prominently wing-angled capsule, three-carpellate, an inch to an inch and a half long.

E. J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—Basal leaf and bulb. Fig. 3.—A sepal. Fig. 4.—A petal. Fig. 5.—Two stamens. Fig. 6.—The gynoecium.

SILENE VIRGINICA

(Plate 623)

SILENE VIRGINICA

Fire-pink

Native of eastern United States

Family CARYOPHYLLACEAE — PINK Family

Silene virginica L. Sp. Pl. 419. 1753.

Truly red flowers are usually such a novelty in temperate regions, that one coming upon them in the wild must always pause to admire their brilliancy. Throughout the open woodlands of the southeastern United States, the fire-pink is of frequent occurrence, its glowing stars seeming somewhat misplaced in those untropical situations, but always a reminder that with increasing warmth of climate, brilliantly colored flowers become more frequent.

Of all temperate genera, the genus Silene seems to have the greatest number of red-flowered species, there being three in eastern North America and the same number on the Pacific Coast. The three eastern species are somewhat similar, differing in habit and size and form of leaf, the differences in flower size being not so marked. By far the most common and widespread is *Silene virginica,* ranging from southern New Jersey to southwestern New York, southwestern Ontario, Minnesota and southward, but common only in the southern portions of its range.

It is quite a desirable subject for large rock-gardens, but in the northern sections it is not always reliably hardy unless raised from seed, and even then may disappear during wet winters. Give it some shade, a well-drained location and fairly light and porous soil, with a light winter covering, and you will be well repaid each summer by its brilliant and cheery red star-like flowers.

The Silenes are all commonly called catchfly in reference to the viscid hairs and glands on the stems and calyces of many species, which act as a trap for would-be insect pilferers of nectar and pollen without due return. These treasures are only for the long-tongued bees, butterflies and moths, which are capable of pollination in return for food.

The name Silene comes from the Greek word for saliva in allusion to the viscid substance mentioned above.

The fire-pink is a perennial herb arising from a cluster of somewhat fleshy roots. The basal rosette is of dark-green, spatulate

leaves three to six inches long, the blade tapering to a long winged petiole with a clasping base; petiole and blade with coarsely long-ciliate margins. The stem, varying from a few inches to two feet in height, is simple below and branched above, sparsely pubescent below, becoming increasingly viscid-pubescent upward into the inflorescence where it is extremely so. The lower cauline leaves are similar to the basal, the petioled upper ones becoming abruptly shortened so that the first bracts of the inflorescence are lanceolate to oblong. The inflorescence is cymosely paniculate, each ultimate branchlet subtended by two small lanceolate to ovate bracts, and terminating in a flower. The calyx is tubular, one-half to three-fourths inch long, viscid-pubescent, prominently veined, the calyx-teeth ovate, obtuse, less than one-fifth the length of the tube. The scarlet to crimson petals are distinctly divided into blade and claw; the blade is three-fourths to one inch long, deeply cleft at the apex, usually with a smaller tooth at about the middle on either margin and crowned with two linear-oblong light red appendages at the base; the claw is about one-eighth inch exserted from, and longer than the calyx, light red in color. The eight to ten exserted stamens have yellowish filaments and yellow anthers. The styles are three in number, greenish below and red above; the one-celled ovary narrowly ellipsoid, the ovules on axile placenta. The calyx, after the flowering stage, becomes inflated and obovoid by the rapidly growing ovary, which at maturity dehisces by three or six teeth. The numerous seeds are brown, papillose, with a central attachment.

E. J. ALEXANDER.

EXPLANATION OF PLATE. **Fig. 1.—Portions of the inflorescence. Fig. 2.—Lower portion of same inflorescence, with central flower of the cyme and cauline leaves. Fig. 3.—A petal and one stamen. Fig. 4.—The gynoecium.**

ROBINIA AMBIGUA

(Plate 624)

ROBINIA AMBIGUA

Robinia pseudacacia x viscosa

Family LEGUMINOSAE — PEA Family

Robinia dubia Foucault, Jour. Bot. **2**: 204. 1813.
Robinia ambigua Poiret, Lam. Encyc. suppl. **4**: 690. 1816.
Robinia hybrida Audib. DC. Prod. **2**: 262. 1825.
Robinia intermedia Soulange-Bodin, Ann. Soc. Hort. **2**: 42. 1828.
Robinia dubia Foucault, Reich. Ic. Fl. Ger. **22**: 93. 1885.

For some years two trees of a pink-flowering *Robinia* have been under observation in this garden, which are located at the southwestern end of the Fruticetum. They have led to many inquiries because they had no name. Close study reveals, at first, a certain affinity to *R. pseudacacia,* with particular similarity in the closely appressed pubescence of the young twigs, petioles and peduncles; but the leaflets are slightly smaller and the thorns shorter. In their habit of growth, time of flowering, and the shape of the racemes the trees show an unmistakable resemblance to *R. viscosa.*

After much deliberation the conclusion was reached that these two trees represent a form of *Robinia ambigua,* the hybrid between *R. pseudacacia* and *R. viscosa;* although no trace of glands could be detected, much less any viscidity, on any part of the plants, which, according to all previous descriptions, is one of the distinguishing characteristics of this hybrid.

The herbarium of the New York Botanical Garden contains a specimen (♯1737) collected in 1915 by Mrs. Orra Parker Phelps near Norfolk, New York. Labeled *R. pseudacacia,* it bears the notation: "Escaped in many places. Flowers pink. Blossoms as late as July 1." This specimen agrees perfectly with the two trees growing here. How this hybrid *Robinia* came to Norfolk, and from where the plants escaped which Mrs. Phelps observed, will be worthy of further study. So far, *R. ambigua* has been known mainly from France where it is said to have originated in cultivation from seed of *R. viscosa;* although it was at one time in cultivation at the Arnold Arboretum, having been received from Berckmans, Augusta, Georgia. So far as is known, the hybrid has never been found with the parents in a wild state.

M. E. de Foucault in the Journal de Botanique describes *R. ambigua* (*R. dubia,* as he calls it) as follows: "Twigs, petioles and peduncles partly glandular, rarely viscid; racemes axillary, loose, and drooping; bracts deciduous, concave, and terminated by a long bristle; calyx acuminate."*

* Ramulis, petiolis, pedunculusque parce glandulosis, rarissime viscosis; racemis axillaribus, laxis, pendulis; bracteis caducis, concavis, seta longa terminatis; calicibus acuminatis.

About the color of the flowers Foucault says: "La corolle est légèrement colorée en rose," which seems to suggest an even light pink, somewhat like that of the flowers of *R. viscosa.*

Reichenbach, who gives a not very satisfactory colored plate of *R. dubia* Fouc. in his Icones Florae Germanicae et Helvetiae, says on page 93 of volume 22: "Corolla alba, vexillo roseo lavato." ("Flower white, standard pink-flushed.") His picture shows clearly viscid glands on the peduncle as well as on the seed pod. No purple flush is indicated on the peduncle, petiole, or calyx.

Foucault says that his *R. dubia* resembles *R. pseudacacia* in its long and loose flower racemes and in its habit of growth; while it resembles *R. viscosa* in the glandular branchlets and petioles, the dark green foliage, short stipules and thorns, reddish calyx and bracts, and in the period of flowering.

The two trees of *R. ambigua* from which the accompanying plate was drawn do not show a trace of glands on any of their parts. In that respect they rather resemble *R. pseudacacia*, except that the fine, appressed pubescence of their twigs, petioles, and peduncles is somewhat denser and persists longer. In their habit of growth and in their rather short, dense flower racemes—which are decidedly not long and loose ("lâche"), as Foucault describes them—they resemble *R. viscosa.* They commence to flower about two weeks later than *R. pseudacacia,* at the same time as *R. viscosa,* which agrees with Foucault's statement. Thorns and stipules are short. The young branchlets, as well as the upper side of the rachis, especially near the base, the base of the peduncle and the calyx are flushed with purple. The flowers are creamy white; but the standards in bud are apple-blossom pink on the outside. Inside, the standards are white with a conspicuous greenish-yellow blotch near the base. The racemes are fifteen to twenty-five flowered, quite dense, and at the average only five to six centimeters long. The seed pods are usually not more than five centimeters long, frequently only three-seeded, and then narrowed between the seeds. The pods are smooth, their stalks persistently appressed-pubescent.

Perhaps the speculation is permissible that this form of the hybrid may have resulted from a cross in which *R. pseudacacia,* instead of *R. viscosa,* was the seed-bearer; which could account for the lack of glands, inherited from *R. viscosa* by the form which Foucault describes.

For much information concerning *R. ambigua,* I am indebted to Mr. Alfred Rehder of the Arnold Arboretum, who also examined specimens from the two trees growing here, and who agrees with me that they belong to *R. ambigua.*

H. TEUSCHER.

EXPLANATION OF PLATE. Fig. 1.—A flowering twig. Fig. 2.—The standard. Fig. 3.—A ripe seed-pod. Fig 4.—A seed × 4.

BILLBERGIA PYRAMIDALIS

(Plate 625)

BILLBERGIA PYRAMIDALIS

Pyramid Billbergia

Native of southern Brazil

Family BROMELIACEAE — PINEAPPLE Family

Billbergia pyramidalis Lindl. Bot. Reg. sub. pl. 1068. 1827.
Bromelia pyramidalis Sims, Bot. Mag. pl. 1732. 1815.
Billbergia bicolor Lodd. Bot. Cab. pl. 1819. 1832.

Many and handsome are the startling color combinations to be found in the Pineapple family, not the least striking being our present subject. It has been in cultivation the longest of any in its genus, having been introduced in 1815, and consequently a number of horticultural varieties and hybrids have been made from it. Our plant coincides quite well with the original description, so that we may well look upon it as the typical form.

As with the other epiphytic bromeliads, these plants grow best in a mixture of fern-roots and sphagnum, and are able to stand any amount of temperature, but must have a considerable amount of water during their growing season. They also make quite satisfactory house plants, as they will tolerate a dry atmosphere, needing only to have water always present within the cupped leaf-rosette.

The pyramid billbergia is an epiphytic plant with ten to twelve leaves in a short rosette, involute and embracing one another to form a cupule in which water usually stands. The leaves are lorate from an ovate base, eighteen inches to two feet long, rather thin in texture, light green, bright red within on the lower portion, thinly white-lepidote and obscurely whitish-barred on the back, narrowed to a recurved, cuspidate tip, the marginal teeth minute, but distinct. The peduncle is stout and erect, white with scurfy tomentum, about one foot long. The lower bract leaves are rose-red, tipped with green, the upper ones entirely bright rose-red, three to four inches long, ovate-acuminate. The flowers, twenty to thirty in number, are borne in an erect, rather dense-flowered thyrse. The ovary is oblong-cylindrical, one-half to five-eighths inch long; the sepals linear-oblong, about the same length as the ovary; both sepals and ovary covered with a white-mealy scurf. The petals are purplish-scarlet, bordered with red-violet, two inches long, the upper portion spreading. The three stigmas are twisted spirally together; the style is filamentary, nearly as long as the petals; the ovary is three-celled; the ovules many in each cell. The six stamens are nearly as long as the petals, three borne on the hypanthium, three attached to the base of the petals between the scales. The fruit is an indehiscent capsule.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—The inflorescence and a leaf. Fig. 2.—A portion of the peduncle, showing a transitional bract with foliar tip. Fig. 3.—A petal and stamen. Fig. 4.—A sepal. Fig. 5.—Gynoecium and androecium × 1.5. Fig. 6.—Base of a petal, showing the scales × 3.

HELIANTHUS TOMENTOSUS

(Plate 626)

HELIANTHUS TOMENTOSUS

Tomentose sunflower

Native of southeastern United States

Family CARDUACEAE — THISTLE Family

Helianthus tomentosus Michx. Fl. Bor. Am. 2: 141. 1803.

The strictly American genus *Helianthus* has long been a favorite in gardens for its late blooming season, ease of growth, and showy flowers. Our present subject is one of the little-known and uncommon species, but is deserving of cultivation for its clear lemon-yellow flowers in half-nodding heads, and for its dark green foliage. The plant is easy to handle and perfectly hardy, producing in the garden many more flowers and more branched stems than in the wild state. It is quite easily distinguished by the long, spreading involucral bracts, the twisted lemon-colored ray-flowers, and the rough-pubescent under surface of the leaves. It is native in mountain meadows and on damp banks in the southern Appalachians and adjacent regions from southern Virginia to northern Georgia, central Alabama, and Mississippi, the more southerly stations being represented by a slightly different form from that in the mountains. The plant from which our plate was made was raised from seed collected in southwestern North Carolina by the Southern Appalachian Expedition in 1933.

Helianthus tomentosus is a perennial herb up to four feet in height. The stem is branched in the upper portion, usually reddish, strongly striate, especially above, sparsely scabro-hirsute below, densely so above. The leaves are ovate to ovate-lanceolate, acute, the base abruptly tapering to a broadly cuneate-winged petiole, dark green and very scabrous above, pale and harshly pubescent beneath, the principal ones four to twelve inches long, the rameal and the bracteal ones two or three inches long. The peduncles are densely scabro-hirsute, more or less inflated immediately below the head. The heads are one to one and a half inches across. The involucral bracts are lanceolate, acuminate, the outer one to two inches long, the inner one-half to one inch long, all shaggy-hirsute without, scabrous within, the base blackish-green, the upper portion dark green. The ray flowers are one to one and a half inches long, lemon-yellow, somewhat twisted. The disk flowers are yellow. The achene is about one-fifth inch long, obovate, slightly flattened, the apex oblique, dark brown or mottled, the pappus semi-deciduous.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—A flowering spray. Fig. 2.—A cauline leaf. Fig. 3.—A ray floret. Fig. 4.—A disk floret at anthesis × 2. Fig. 5.—A disk floret with the stigmas receptive × 2. Fig. 6.—An achene × 2.

PLATE 627

ADDISONIA

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DAPHNE GENKWA

(Plate 627)

DAPHNE GENKWA

Native of Northeastern China

Family THYMELAEACEAE — MEZEREUM Family

Daphne Genkwa Sieb. & Zucc. 1835, Flora Japonica I. p. 137.
Daphne Fortunei Lindley 1846, Journal Royal Hort. Soc. I. p. 147.

This lovely Daphne is still extremely rare in cultivation, a fact which seems rather deplorable, since no more desirable ornamental plant has ever been introduced from Asia into the gardens of Europe and America. It was first sent to England in 1844 by Robert Fortune, who had collected it in China. Both there and in Japan it is frequently grown as an ornamental shrub.

There is no valid reason for the scarcity of *Daphne Genkwa* in occidental gardens, for, while it is true that seeds are quite unobtainable, cuttings—if taken in early summer—are no more difficult to root than are those of *Daphne Cneorum*. When the young side-shoots first begin to show signs of arresting their growth—yet while they are still quite soft—is the time when they may best be used for cuttings. Severed from the main stem as close to their base as possible, but without a "heel," and inserted in moist sand, up to 75 per cent of them should root within two or three months. However, the open cutting-bench or the built-in propagating-frame inside a greenhouse has been found to give less satisfactory results than a double-pot arrangement. This consists of a seed-pan with a smaller pot inserted in its center. The space between the two holds the rooting medium. The center-pot with its drainage hole closed is kept filled with water. The whole arrangement is covered with a bell-glass. Or, a wooden box or flat, elevated on upturned pots with constantly wet cinders underneath, may be used. The four sides of the box should be surrounded with panes of glass, with a fifth pane as a cover. Ample light seems to be an important requirement for success.

Given an open, airy position and thorough drainage, the mature plant is hardy in the vicinity of New York City. Indirect partial shading, however, is advisable during the winter, since, at least here in the eastern states, the flower-buds tend to be injured by the winter sun. *Daphne Genkwa* flowers outdoors at the end of March or in early April, but if kept in a pot in a cool greenhouse, it will bloom without force during February. In flower it closely resembles a

small lilac, although it is scentless, and as a small potted plant it is extremely decorative. There should be a future for this Asiatic shrub as a winter-flowering pot plant.

Daphne Genkwa is a low, much-branched shrub, reaching in cultivation rarely more than two feet in height. Its slender branches are densely appressed-pubescent during the first two or three years. They are green at first, light brown during the second year, and grayish brown later. Its short-stalked leaves, which are elliptic and short-acuminate or obtuse, are one to two inches long and about one-half inch wide. They are fresh grass-green when young, later dark green above and light green beneath, with scattered hairs along the veins of the underside and ciliate hairs along the margin. Usually the leaves are opposite but occasionally alternate leaves may be found towards the base of the shoots. The lilac-colored flowers, which appear shortly before the leaves, are produced in clusters of two to seven. At first these flower-clusters are almost sessile on the twigs but gradually they are pushed out more and more on the tips of the young shoots as these lengthen. The corolla-like calyx is funnel-shaped with four obtuse, spreading lobes. Four of the orange anthers are inserted immediately below its mouth, four others below them about halfway down the tube. As with all other species of this genus, the flowers have no petals. As far as known to the writer this species has never produced fruits in cultivation. In China and Japan and dried flowers and bark of *Daphne Genkwa* are used medicinally in the same manner as those of *Daphne Mezereum* are used in Europe.

HENRY TEUSCHER.

EXPLANATION OF PLATE. Fig. 1.—A flowering branch. Fig. 2.—A leafy branch. Fig. 3.—The corolloid calyx laid open, showing the stamens × 1.5. Fig. 4.—The pistil × 2.

COSTUS MALORTEANUS

(Plate 628)

COSTUS MALORTEANUS

Malort's Costus

Native of Costa Rica

Family ZINGIBERACEAE — GINGER Family

Costus Malorteanus **H. Wendl. in Hamb. Gartenz. 19: 30. 1863.**

Members of the genus *Costus* are not often seen in cultivation outside of botanical collections, as the plants require too much room for growth, and usually require a house with more moisture than the average pot plant can tolerate. They are of value chiefly for their foliage, as the flowers, though large, are of too fleeting a nature for ornament. Our present subject is one of the finest, its rich green foliage being handsomely barred with darker bands, the whole covered with soft silky hairs. The leaves are about one foot long and eight inches wide, and grow close together in spiral arrangement on the stem, which is two to three feet tall. The plant is native to Costa Rica, where it was first collected by H. Wendland in 1857, and introduced to cultivation by him, though it was not named until 1863.

Malort's Costus is a perennial herb with stems about three-fourths inch thick, and one to three feet in height, softly hirsute. The lower portion of the stem is covered with softly hirsute bract-like sheaths; the upper portion is leaf-bearing. The leaves are spirally arranged, horizontally spreading, obovate, eight to twelve inches long and five to nine inches broad, abruptly narrowed to a short petiole, the sheath short, long-ciliate at the mouth: the blade is rich green above, vertically banded with nearly black cross-markings, covered with short, dense, silky hairs; pale and somewhat glaucous below, with long, soft, appressed silky hairs. The inflorescence is a short, ovoid spike one to three inches long, terminal and subsessile. The bracts are about fifteen in number, one inch long and much broader, closely imbricated, light green with a bright green margin and central rib, the apex broadly rounded and keeled, the lower portion crimson within. The flowers are about two and one-half inches long, short-lived, deliquescing in the afternoon. The ovary is obovoid, white. The three calyx lobes are crimson, bluntly ovate, unequal. The corolla proper has a short hairy tube, the three erect petals are oblong, obtuse, light orange-yellow; the lip golden-yellow with close-set orange-red veinings on the expanded portion which consists of one large three-lobed dorsal lobe and three small subspatulate lobes on the ventral side, all the lobes being sharply recurved. The filament is erect, broadly linear-oblong, dilated at the middle, the tip

recurved; the anther is oblong. The style is filamentary, the transversely oblong stigma ciliate.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence and the two small floral leaves. Fig. 2.—The upper petal. Fig. 3.—A lateral petal. Fig. 4.—The stamen. Fig. 5.—The gynoecium, calyx and subtending bractlet. Fig. 6.—An inflorescence bract, inner face.

PLATE 629

ADDISONIA

LUPINUS NANUS

(Plate 629)

LUPINUS NANUS

Dwarf lupine

Native of California and Oregon

Family FABACEAE — PEA Family

Lupinus nanus Dougl. ex Benth. in Trans. Hort. Soc. n.s. 1: 409. 1835.

While many of the lupines are more showy than *Lupinus nanus*, this dwarf species is one of the neatest annuals to use for bedding or as a pot plant. The low-growing species make quite a display in the wild state, as they grow over great areas, making splashes of blue on hillsides and valleys; and by their intermingling with other plants forming varicolored carpets. This species was discovered in Monterey County, California, by David Douglas in 1831–2, and introduced to cultivation in Europe. It was at once well recommended for its neat growth and long flowering period. It is now known to range in the wild from western Oregon southward to Santa Barbara and Kern Counties in California. Since it is very variable in nature, no one variety covers the entire range.

The dwarf lupine is an annual herb, the stem usually branched at the base. The stem is erect, eight to fifteen inches tall, the pubescence more or less villous, minutely spreading or appressed. The leaves are long-petioled, the leaflets five to seven, linear to spatulate, three-fourths to an inch long, appressed-hairy above. The flowers are borne in well separated verticils on pedicels about one quarter inch long. The calyx is hirsute, about one-quarter inch long. The corolla is three-eighths to five-eighths inch long, rich blue or occasionally pink, often shaded with violet; the standard nearly orbicular with a prominent white or yellowish center with a few violet pencilings, becoming all violet with age; the wings strongly auricled above the white claw-like base, with radial violet veins extending out from the auricle; the keel whitish blue with black-violet acumen, the upper edges of the acumen ciliate. The ten stamens are monadelphous, the anthers alternately of two forms. The seed-pod is appressed-pubescent, three-fourths to one and one-fourth inches long, containing four to twelve variously mottled seeds.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—A flower spray, leafy spray and inflorescence in bud. Fig. 2.—The standard. Fig. 3.—A wing. Fig. 4.—The keel. Fig. 5.—The androecium × 2.5. Fig. 6.—The calyx and gynoecium × 2. Fig. 7.—A ripe legume.

BEGONIA SOCOTRANA

(Plate 630)

BEGONIA SOCOTRANA

Native of Socotra

Family BEGONIACEAE — BEGONIA Family

Begonia socotrana Hook. f., Gard. Chron. n.s. 15: 8. 1881.

Situated in the Indian Ocean about 140 miles off the northeast corner of Africa the hot and dry Island of Socotra is 72 miles long and about 22 miles in width. The first scientific exploration of this Island, which was undertaken in 1880 by an expedition led by Sir Isaac Bayley Balfour, resulted in the discovery of a considerable number of endemic plants, including the attractive *Begonia socotrana*. This species was found growing in the shade of boulders in the higher regions of the Haghier hills on the north side of the island, and living specimens were collected and shipped to England where they flowered for the first time at Kew in December, 1880. From these plants the type description of the species was made.

Following its introduction into cultivation, *Begonia socotrana* quickly became popular and hybridists early began to use it as a parent. The results of their efforts are to be seen today in the magnificent race of large-flowered fall-blooming varieties which have been derived from *Begonia socotrana* and various tuberous-rooted Andean species, as well as in the popular Christmas Begonias which have *B. socotrana* and the South African *B. Dregei* as parents.

The first hybrid Begonia to be introduced having *B. socotrana* as a parent was raised by Messrs. Veitch of England and was obtained by fertilizing that species with pollen from a crimson-flowered tuberous variety known as Vicountess Doneraile. This hybrid first flowered in 1885 and was distributed three years later under the name John Heal. In later years Veitch produced many fine Begonias belonging to this group, some of the most popular being Adonis, Winter Gem, Emita and Mrs. Heal. Together with Veitch, Messrs. Clibran of England have been responsible for raising most of the fall-flowering hybrids of this type in cultivation today. Clibran's introductions include Optima, Mrs. Clibran, Emily Clibran, Fascination and Exquisite.

The first of the so-called Christmas Begonias was produced in 1892, when Messrs. Lemoine of France succeeded in crossing *B. socotrana* with *B. Dregei*. This hybrid was named Gloire-de-Lorraine. It was introduced in 1893 and in succeeding years be-

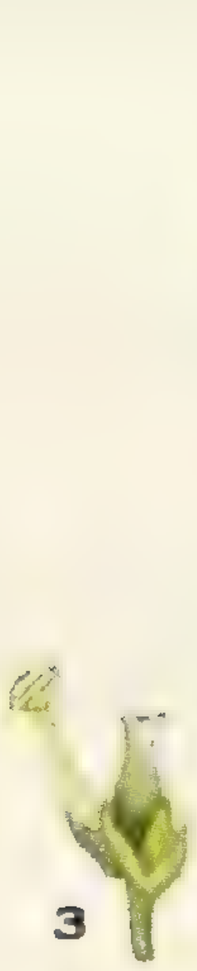
came, perhaps, the most popular Begonia ever brought into cultivation. It is still raised, although other varieties which have been derived from it now find greater favor with growers. Gloire-de-Lorraine was followed by such varieties as Turnford Hall, Mrs. Leopold de Rothschild and Amabilis and by the American-raised Mrs. Peterson and Glory of Cincinnati. Two of the most popular varieties of this section grown today are Melior and Lady Mac.

Despite the magnificence of its hybrid progeny, *B. socotrana* is still worth while growing as a decorative plant. Its cultivation involves no special problem providing tropical greenhouse conditions are available. At the commencement of the growing season (August or early September) the plants are repotted in a soil containing a generous amount of leaf-mold and sharp sand. If increase is desired, the cluster of bulblets which form the rootstock is divided, each division consisting of four or five of these bulblets, a more complete division being usually disastrous. Shade from bright sunshine, care in the matter of watering, and the maintenance of a humid atmosphere provide the requisite growing conditions. The blooming season is from mid-December until the end of January, after which time the plants pass gradually into a dormant stage and so remain until the following August.

Begonia socotrana is a sparsely hairy, tender, herbaceous perennial with a rootstock consisting of tight clusters of pale green resting buds or budlets at the surface of the ground. From each bud cluster arises an erect, sparingly branched succulent stem bearing from one to three orbicular, peltate, succulent leaves, each up to seven inches in diameter. The center of each leaf is strongly depressed and the margins are recurved and crenate. The inflorescence is carried well above the foliage; all the flowers are staminate except the terminal one of each cyme-branch, which is pistillate. The flowers are of a clear rose-pink color and measure approximately two inches across; the staminate ones have four obovate petals, two of which are smaller, and a central globose cluster of stamens furnished with short filaments and bright yellow, clavate anthers with recurved tips. The pistillate flowers each have six equal elliptic-obovate perianth segments; the styles are bright yellow with short, spreading and incurved arms and cordate stigmas. The ovary is three-angled, with the dorsal cell moderately winged.

T. H. EVERETT.

EXPLANATION OF PLATE. Fig. 1.—A flowering inflorescence. Fig. 2.—A leaf. Fig. 3.—A male flower with the petals removed ×2.5. Fig. 4.—A stamen ×3. Fig. 5.—A female flower with the petals removed ×2. Fig. 6.—Front and rear view of one of the stigmas ×2.5.



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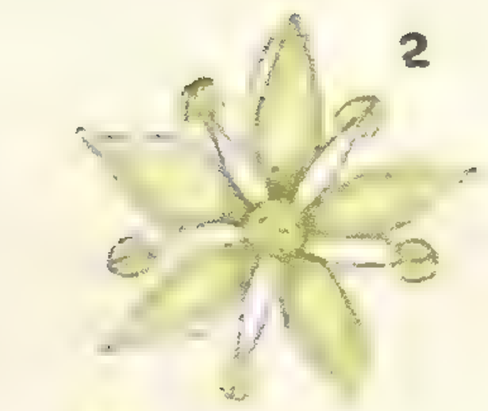

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Sorensen.

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CYRILLA ARIDA

(Plate 631)

CYRILLA ARIDA

Titi

Native of the Lake Region, Florida

Family CYRILLACEAE — TITI Family

Cyrilla arida Small, Bull. Torrey Club, 51: 383. 1924.

The genus *Cyrilla* is a small assemblage of species centering in the tropical American region, both insular and continental, and extending well into the southeastern United States. About a half dozen species represent the total—three of them in the southeastern United States and the others in the Antilles and the tropical mainland. *C. racemiflora,* which is the most common titi of our southeastern region—is the only species in the genus which occurs on both sides of the Gulf Stream. However, we can safely assume that all the titis, or their ancestors, of our southeastern mainland sometime in the past came from the West Indies, either before there was a Gulf Stream or when its course was different from that of the present one. At one time, for example, this all-important ocean current swept across the early foundation of northern Florida north of the old Oligocene Island, or through what is now, in a general way, the drainage of the Suwannee River (Little San Juan) and out into the Atlantic Ocean near the present mouths of the St. Johns and St. Marys Rivers. Whatever agencies of dispersal were active in that geologic age, they distributed *Cyrilla* to the lands north and west of the course of the early Gulf Stream, with one exception: that is the plant or its ancestors here illustrated and discussed.

Our two other species of the southeast, *Cyrilla racemiflora* and *C. parvifolia,* are plants of wet stream-banks, swamps, and "bays." *Cyrilla parvifolia* is a very outstanding plant in the Gulf Coastal Plain east of the Mississippi River. This titi, also called white titi, and its cousin the black titi or buckwheat bush (*Cliftonia*), dominate the woody vegetation of the "bays" or bay-heads, so that "titibay" has naturally become the popular designation of the "bays" of that region which are marked by this characteristic vegetation. In some localities the shrubs grow in running or standing water during long periods of each year, for the "bays" are small swamps at the sources of sluggish streams.

To one accustomed to seeing these shrubs in their normal habitats, the surprise was great one day in the winter of 1920 to find a grove

containing both shrubs and trees of the species here illustrated (and then undescribed), growing on the highest parts of the dry sand-hills in Highlands County, Florida, on the backbone of the State. Two distinct forms of branching were present in the two types of plants. Some specimens had short stiff branches, while others had long sinuous vine-like branches. The leaves are evergreen and the plants are conspicuous both when in flower and in fruit. The myriad panicles of flowers form a white cloud over the white sands; then in the fruiting stage the white is supplanted by clear yellow, creating a scene not duplicated elsewhere in our flora. Two years ago the type locality was visited twice, first in September, with the thermometer at seventy-five degrees, when the yellow fruits were mature, then in December when the fruits had become dead ripe and brown. The thermometer then indicated thirty degrees and a strong gale was blowing the tiny capsules in every direction over the desert sands.

A beginning has been made in the cultivation of this plant. Last spring (1935) two dozen plants were placed in pots with a mixture of humus and flat-woods sand and kept in a slat-house. This spring (1936) twelve of the plants are alive and flourishing. A large quantity of seeds have been distributed to the botanical gardens of the Old World and to many growers in America.

The desert titi is a shrub or small tree with gray, glabrous twigs and triangular leaf-scars. The leaves, clustered at the ends of twigs, are about an inch long, glabrous, pale-green when young, but slightly darker above than beneath, evergreen. The blades are spatulate to narrowly elliptic, with an acute, callous, yellowish tip, entire, with the midrib prominent on the lower side, impressed on the upper side, faintly veined beneath, short-petioled. The panicles are raceme-like, an inch and a half to two and a half inches long. The bracts are subulate and the bractlets lanceolate or triangular-lanceolate. The pedicels are very short, glabrous, spreading. The flowers are white, numerous. The five sepals are succulent, lanceolate or ovate-lanceolate, one-twelfth of an inch long or nearly so, pale-green, erect, acuminate. The five petals are white, lanceolate, slightly longer than the sepals, acute, spreading, more or less involute. The five stamens are ascending, with the filaments subulate, white, and the anthers ovoid, greenish-white, about half as long as the filaments, notched at the apex. The gynoecium is erect. The ovary is white, conic-ovoid, seated on a green disk. The style is very short; the stigma two-lobed. The capsule is globose-ovoid, often depressed, yellow when mature, very persistent and ultimately turning brown.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, × 4. Fig. 3.—Calyx, gynoecium, and 1 stamen, × 4. Fig. 4.—Bud, × 4. Fig. 5.—Fruiting twig.

VRIESIA DUVALIANA

(Plate 632)

VRIESIA DUVALIANA

Duval's Vriesia

Native of southern Brazil

Family BROMELIACEAE — PINEAPPLE Family

Vriesia Duvaliana E. Mon. Belg. Hort. **34:** 105, pl. 7–8. 1884.
Tillandsia Duvaliana Baker, Journ. Bot. **26:** 48. 1888.

The genus *Vriesia,* though a member of the Pineapple family, does not have flowers so attractively colored as do those most showy-flowered members of the family, the Billbergias, as the colors of its inflorescence are usually only various shades of red, yellow and green—or occasionally pink or white. The species of *Vriesia* most frequently seen in Bromeliad collections is *V. carinata,* which is bright red and yellow bracted, with dull flowers. Our present subject is not even that showy, since the bracts during flowering are dull red with green tips, and the flowers green, but since the flower spike takes two or three months to pass through the blooming period, it is a long-lasting decoration. The species was introduced into cultivation about 1875 from southern Brazil. A number of hybrids have been made, using it as a parent. Chief among these is *V. versaliensis* (Rodig.) Truffaut, which is a hybrid between *V. Duvaliana* and *V. carinata,* and has a shorter and broader inflorescence, as would be expected.

As with other Bromeliads, Vriesias are best grown when potted in a mixture of fern-root and sphagnum and kept in a house with high temperature and an abundance of moisture.

Vriesia Duvaliana is an acaulescent epiphyte; the leaves, about twenty in number, are six to eight inches long, dull yellow-green, tinged with red, especially when young, the broadly ovate, hyaline-margined bases imbricated into a hollow cupule in which water is retained; the apex prominently apiculate. The inflorescence is simple, the peduncle clothed with sheathing bracts, forming a transitional series from leaves to floral bracts. The flower-bearing portion is oblong-linear, about nine inches long, strongly compressed laterally, the bracts bright red with green tips, tinged with brown dorsally, the flowers exserted on the ventral side. The bracts are one and one-half to two inches long, broadly conduplicate-falcate, keeled on the upper third, the lower bracts broader and more inflated than the upper ones. The three calyx lobes are about one inch long, blunt-tipped. The three petals are oblong-lniear, about two inches long, only the upper half-inch exserted, bright yellow-

green, the included portion becoming pale yellow. The six stamens are about the same length as the petals. The pistil is the same length as the stamens, the style filamentary, the branches connivent into a narrowly funnel-shaped tube, the stigmatic lobes subrotund, spreading. The fruit is a three-angled capsule about two inches long.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—Flowering portion of the inflorescence and a leaf. Fig. 2.—A sepal. Fig. 3.—A petal and stamen. Fig. 4.—The gynoecium. Fig. 5.—Style tip, showing stigmas. Fig. 5.—Entire plant, reduced.

PLATE 633

ADDISONIA

KALANCHOE ALICIAE

(Plate 633)

KALANCHOË ALICIAE

Native of Madagascar

Family CRASSULACEAE — STONECROP Family

Kalanchoë Aliciae Hamet, in Bull. Soc. Bot. France, **57:** 191. 1910.
Bryophyllum Aliciae Berger, in E. & P. Nat. Pfl. ed. 2. **18a:** 411. 1930.

Kalanchoë Aliciae is a native of the Island of Madagascar and was first collected in 1894 by Forsyth Major, but was not described botanically until sixteen years later. Recently it has found increasing favor with fanciers of succulent plants and in consequence is now becoming more plentiful in American gardens. It belongs to a group of the genus characterized by drooping rather than erect flowers. This group appears to be endemic to Madagascar and the adjacent African mainland and is represented in cultivation by such species as *K. Daigremontiana, K. tubiflora* and *K. Fedtschenkoi.*

More than two hundred species of *Kalanchoë* have been described, some of whose names are undoubtedly synonyms. The genus is widely distributed in the tropical and subtropical parts of Africa and Asia and has one representative (*K. braziliensis*) in tropical America. In his recent treatment of the Crassulaceae Berger refers *Kalanchoë Aliciae,* together with most other members of the group having pendulous flowers, to *Bryophyllum,* basing his separation on technical characters, but for the present it seems preferable to retain the name *Kalanchoë* for our cultivated plant, particularly as this is the treatment followed in the latest supplement to Bailey's Hortus.

The velvety leaves and orange flowers of *Kalanchoë Aliciae* give to the plant a most distinctive appearance and render it worthy of serious consideration by every gardner who grows succulent plants and has facilities for accommodating specimens three to four feet high. It responds to the cultivation appreciated by other kinds of *Kalanchoë,* but because of its hairy leaves particularly resents wetting of the foliage.

Kalanchoë Aliciae has a stout, erect, simple or occasionally branched stem reaching a height of from two and one-half to four feet. The leaves are opposite, broadly oblong-ovate to nearly round, two to three inches long and nearly as broad. They are borne on stout petioles two to three inches long; at base they are frequently broadly truncate and nearly or quite devoid of teeth; the rest of the margin, including the broadly rounded tip, is conspicuously serrate with blunt teeth. At the summit of the petiole they frequently bear

a pair of small erect green appendages. The leaves and stems are uniformly covered with fine, but rather stiff, erect, whitish hairs. The terminal inflorescence is a trichotomous cyme with rather slender branches. The terminal branches are drooping and bear each a nodding flower about an inch long. The calyx is cup-shaped, one-fourth inch long with four broadly deltoid acute teeth. The corolla is slender and tubular, slightly expanded above with four short ovate lobes conspicuously notched at the apex; within, the corolla is beautifully marked with red against a yellow background. The eight stamens are attached to the corolla not far from its base and the slender filaments extend to the base of the corolla lobe. The four pistils are erect and connivent, ending in four slender styles about as long as the corolla.

T. H. EVERETT.

EXPLANATION OF PLATE. Fig. 1.—A flowering spray × ⅔. Fig. 2.—Lower leaves of the same spray. Fig. 3.—The corolla laid open to show position of stamens × 1½. Fig. 4.—Two corolla-lobes with stamens removed to show design of venation × 1½. Fig. 5.—The gynoecium and glands × 1½.

CARAPA PROCERA

(Plate 634)

CARAPA PROCERA

Tall Carapa

Native of West Indies, Guiana, and Tropical West Africa

Family MELIACEAE — MAHOGANY Family

Carapa procera DC. Prodr. **1:** 626. 1824.
Trichilia procera Forsyth; DC. Prodr. **1:** 626, as synonym. 1824.
Carapa guineensis A. Juss. Mém. Mel. 91. 1830.
Carapa Touloucouna Guillem. & Perr. Flor. Seneg. **1:** 128. 1831.
Xylocarpus procerus Steud. Nom. ed. 2. **2:** 793. 1841.
Racapa procera Roem. Syn. fasc. **1:** 123. 1846.
Touloucouna gigantea Roem. Syn. fasc. **1:** 123. 1846.

Carapa is a member of the family which produces some of our most valuable timbers. The genus comprises about twenty-four species, most of which are African. Several species, however, notably *C. guianensis* Aubl., are entirely American in their distribution. *C. guianensis* is readily distinguished from the present species by its tetramerous flowers.

C. procera, which is known in Africa by the native name of Touloucouna, bears seeds which are very rich in oil, which natives of the region put to many uses. It also produces a useful timber, as do other members of the genus. The species thrives in greenhouse cultivation and will attain large dimensions.

The tall carapa is a high much-branched tree, in nature attaining a height of more than eighty feet. Its trunk is straight and robust, with brownish rugose bark. The branches are long and spreading, the branchlets brownish and glabrous. The leaves are alternate, glabrous, equally pinnate, often over three feet in length. The petiole and rachis are straight, somewhat rugose, and lenticellate. The large glossy leaflets are twelve to twenty-four in number, with short stout swollen petiolules. The blades are coriaceous, elliptic-oblong, obtuse to cuneate at base, short-acuminate at apex, entire at margins, dark green above, somewhat paler beneath, with a prominent midrib and several pairs of straight secondary nerves. The numerous glabrous flowers are laxly arranged in long narrow axillary and terminal panicles. The branchlets of the panicles and the slender pedicels are minutely bracteolate at base. The calyx bears five short, ovate, ciliate segments. The petals are five, alternate with the calyx lobes, ovate-oblong, carnose, yellowish-white, marked with red or brown without. The filaments are united into a carnose cylindric-conical ten-dentate tube which is yellowish-white except at the reddish apex. The anthers are ten, affixed within the tube distally, ovate-oblong, sessile, bilocular, longitudinally dehiscing, alternate with the lobes of the tube. The disk is carnose, cupuliform, reddish, denticulate at apex, forming a short tube around the ovary.

The ovary is slightly five-angled, surmounted by a short style and discoid stigma. The capsule is large, woody, rugose-tuberculate, slightly five-angled, apiculate at apex, five-valved, five-locular. The locules are several- to many-seeded; the seeds are three-angled, acute at base, convex at apex.

ALBERT C. SMITH.

EXPLANATION OF PLATE. Fig. 1.—A branch of the inflorescence. Fig. 2.—Interior surface of the staminal tube × 3. Fig. 3.—An anther × 18. Fig. 4.—Inner organs of a flower, with sepals, petals, and stamens removed × 5. Fig. 5.—A leaflet with portion of rachis. Fig. 6.—Entire leaf and inflorescence, greatly reduced.

HELIANTHUS ANGUSTIFOLIUS

(Plate 635)

HELIANTHUS ANGUSTIFOLIUS

Swamp Sunflower

Native of eastern United States from New York and Missouri southward

Family CARDUACEAE — THISTLE Family

Helianthus angustifolius L. Sp. Pl. 906. 1753.

Yellow is a dominant color in the Thistle Family. In the east, sunflowers (*Helianthus*), goldenrods (*Solidago*), golden-asters (*Chrysopsis*), rosin-weeds (*Silphium*), gum-plants (*Grindelia*), cone-flowers (*Rudbeckia*), tickseeds (*Coreopsis*), and sneezeweeds (*Helenium*) are well-known examples, some of which are frequently seen in gardens. All plants of some genera have yellow flowers without exception; in other genera more or less red has entered into the corollas so that red or pink flowers result. In the sunflowers the rays are usually yellow, but in many species the flowers of the disk are dark.

The swamp sunflower is a gregarious plant. Spreading by underground stolons it often forms extensive colonies. With few leaves to distract the eye, at flowering time the numerous bright yellow heads are unusually conspicuous. The plant usually flowers in the same months as the goldenrods, and like them has a long season. Although the goldenrod may occur in large masses, the sunflower is more showy as the yellow of the ray is of a purer tint and richer. Like many other members of the Thistle Family, this sunflower has become accustomed to a variety of soils and habitats, among them thickets, open woods, marshes, edges of swamps, sandy hills, sandy old fields, pinelands, sphagnum-magnolia swamps, and railroad embankments. Consequently the plant lends itself readily to cultivation in almost any kind of soil, and is therefore frequently seen in gardens, where it usually behaves as a biennial.

It is a curious fact that the sunflowers with many narrow leaves, among them *Helianthus orgyalis, H. polyphyllus, H. filiformis,* have very many flower-heads. The plants serve a good purpose where a background of massed greenery furnished by the numerous conspicuously narrow leaves topped by a roof of yellow is required.

The swamp sunflower is a scabrous or hispidulous perennial. The stems are usually four or five feet tall and more or less branched. The leaves are few and alternate, with linear, usually narrowly

linear, blades on the lower part of the stem, all entire and ultimately strongly revolute, sessile, or on the lower part of the plant narrowed into winged petiole-like bases. The flower-heads are on long, mostly naked peduncles. The involucre is nearly flat. The bracts are in several rows, linear-lanceolate to linear-subulate, attenuate into slender stipes, minutely pubescent or hispidulous. The ray-flowers are mostly about fourteen in number. The ligules are bright-yellow, firm and not readily shriveling. The low conic disk is dark chocolate-brown.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Tip of a flowering plant, about ⅔ nat. size. Fig. 2.—Disk-flower with a bractlet × 4½. Fig. 3.—Achenes × 2. Fig. 4.—Piece of stem with leaves and axillary buds.

FERRARIA UNDULATA

(Plate 636)

FERRARIA UNDULATA

Ferraria

Native of Cape Colony

Family IRIDACEAE — IRIS Family

Ferraria undulata L. Sp. Pl. ed. 2. 1353. 1763.

Among the many oddities of the plant kingdom which have come to us from the Cape of Good Hope, the endemic genus *Ferraria* deserves high ranking. In that strange floral region, the Iris family reaches its greatest center of distribution, and many fantastic flower forms are developed. While this is not an extremely fantastic flower, it is a curiosity within its family, for not many iridaceous plants are pollinated by carrion insects, as this one must be, by reason of its fetid odor.

Our present subject, being the oldest known species of the genus of which it is the type, was known to the pre-Linnaean botanists, who were apparently puzzled as to its relationships, as they called it variously *Flos indicus, Gladiolus indicus, Narcissus indicus* and *Iris stellata.* It was figured in the works of Ferrari, Rudbeck, Morison, and Barrelier under these older names, and by Miller and later authors under the name given it by Burman and taken up by Linnaeus.

The genus is named for Jean Baptiste Ferrari, an early Italian botanist, by whom it was figured in 1646. Six of the seven known species are endemic in the Cape Colony, one being endemic in Angola. The Cape species all have the dark greenish or purplish color of the one illustrated; only the one from Angola is bright yellow. The flowers last little more than half a day.

Ferrarias may be grown in a cool greenhouse under the same conditions as the better-known South African bulbous plants such as *Ixia* and *Watsonia,* and flower in February and March.

Ferraria undulata is a perennial plant arising from an irregularly shaped corm. The lower portion of the stem is sheathed by five to seven conduplicate leaves, dark blue-green in color and with a prominent midrib. These become abruptly reduced to the much shorter bracts of the much-branched inflorescence. Each of the inflorescence branches is terminated by a two-flowered spathe, the second bract of which is narrow and pale colored and included within the larger bract. The flower is long-pediceled, the perianth sessile on the three-angled ovary, the pedicel and ovary concealed by the outer

floral bract. The perianth is about two inches across, the divisions all similar in form, and cupped for the lower half. The divisions are greenish on the narrowed claw, and heavily streaked with brown-purple; the expanded portion is dark brown-purple with irregular whitish mottlings, the margin greenish-yellow, and tightly curled and crisped. The filaments are united into a tube for four-fifths of their length, the upper fifth free and spreading, the whole whitish with brown-purple streaks. The anthers are opposite the style-branches, the sacs parallel. The style is greenish, somewhat clavate, the three branches flattened, brown-purple, penicillate and yellowish at the stigmatose tip.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—Terminal portion of the inflorescence. Fig. 2.—The androecium at anthesis × 2. Fig. 3.—The androecium from an unopened bud × 4. Fig. 4.—The stigma and styles, with the top of the ovary × 2. Fig. 5.—A portion of the inflorescence with the bracts opened to show floral arrangement. Fig. 6.—An entire plant, much reduced. Fig. 7.—The upper half of a leaf.

CRASSULA PERFOLIATA

(Plate 637)

CRASSULA PERFOLIATA

Native of South Africa

Family CRASSULACEAE STONECROP Family

Crassula perfoliata **L. Sp. Pl. 404. 1753.**
Rochea perfoliata **DC. Prodr. 3: 393. 1828.**

Crassula perfoliata is an old inhabitant of our gardens, and is recorded as having been in cultivation since 1700. At the present time it is often included in fancier's collections of succulent plants and is seen occasionally thriving in a sunny window under ordinary dwelling-house conditions, although when fully developed the plant is rather large for this use.

It is a native of South Africa and, like most succulent plants from that region, when grown under glass in New York appreciates some slight protection from the full intensity of the sun's rays during the hottest months of the year. At all other times full exposure to sunshine is desirable.

Crassula perfoliata grows best in an open, porous soil containing a reasonable amount of lime, and as it makes a vigorous root-growth, receptacles of ample size should be provided for its best development. When these are well filled with roots occasional applications of liquid stimulants are of benefit.

Growers inexperienced in the cultivation of succulents in pots frequently stunt their plants by failing to supply sufficient water, believing that in this way they are simulating the natural conditions under which such plants grow. Experience proves that under the extremely artificial conditions imposed by indoor pot cultivation the best results are obtained by supplying water sufficiently often and in such quantities as to maintain the soil in a pleasantly moist condition. This is especially important throughout the active growing season. No suspicion of stagnation must ever exist in the soil, and to avoid this ample drainage must be provided.

Increase of this plant is readily secured by means of cuttings inserted firmly in sand which is maintained reasonably moist, the cuttings being kept in a light airy place until they have rooted.

Crassula perfoliata forms a stout and fleshy, erect, leafy stem, three or four feet in height and usually branched above. The leaves are opposite, set closely together along the stem and form four distinct vertical ranks. Each pair of leaves is distinctly connate at the base and the individuals are four to six inches long. They are narrowly lanceolate in shape, tapering rather regularly from the base

to the acute apex, thick and fleshy, rounded beneath and broadly but shallowly channeled above. The inflorescence is a terminal, freely branched, trichotomous cyme, the upper branches becoming progressively shorter and the very short terminal ones bearing each a salmon-pink flower. The five sepals are lanceolate, erect, united toward the base and minutely hairy. The five petals are erect at base and pale in color; above the middle they are spreading or slightly recurved and salmon-pink on the exposed inner side. The stamens are ten in number, erect, somewhat shorter than the petals and barely protruding from the flower. The five pistils are slenderly fusiform, erect, and as long as the stamens.

T. H. EVERETT.

EXPLANATION OF PLATE. Fig. 1.—A branch of the inflorescence. Fig. 2.—A flower ×2½. Fig. 3.—Three corolla-lobes to show position of stamens ×2½. Fig. 4.—The gynoecium ×2½. Fig. 5.—The calyx and pedicel bracts ×2½. Fig. 6.—A section of the main stem and a leaf.

2

4

3

NAPOLEONA MIERSII

(Plate 638)

NAPOLEONA MIERSII

Napoleona

Native of Tropical West Africa

Family LECYTHIDACEAE — BRAZIL-NUT Family

Napoleona Miersii J. D. Hooker, Bot. Mag. *pl. 7199.* 1891.

The genus *Napoleona* was for a number of years after its discovery in 1787 a much-argued affair, some botanists doubting its existence, others each insisting that the preceding writer on the genus was wrong in his structural description. Some of the confusion was cleared in 1874 when John Miers, checking up the work of the others, came to the conclusion that each was dealing with a distinct species and that apparently none had found the type species of Palisot de Beauvois, discoverer of the genus. More recent work has fairly cleared up the species of the genus; most of the eight species retained by Miers still are valid, but a few more have been described, the species now being fourteen in number.

After much confused discussion of botanical relationships, the genus for a number of years has found a resting place in the Lecythidaceae, in which it probably does not belong, for in its floral structure it does not at all resemble members of that family. It will probably some day be accepted as representing a distinct family, related to the Myrtaceae.

The entire genus *Napoleona* is endemic in Tropical West Africa, where the plants grow as large shrubs or small trees on river banks and in the forests. The plants have much the aspect of a *Camellia* when not in bloom, and flower very rarely in cultivation, requiring tropical-house conditions.

The species here illustrated was first flowered at Kew in 1890 and described as a new species by Sir Joseph Hooker the following year. It is native to northern Nigeria.

Napoleona Miersii is a large spreading shrub, the main trunk and branches covered with close brown bark. The leaves are alternate, bright green and leathery, glabrous, 3–7 inches long, the tip abruptly short-acuminate, the margin entire or undulate, the blade with seven to ten pairs of shallowly impressed veins. The flowers are sessile on the branches and branchlets, often subtended by a few small bracts. The five lobes of the calyx are ovate and acute, valvate in bud, very thick and leathery, each lobe with a gland at one side near the apex. The corolla and the staminal portions of the flower are

extremely curious in their structure. A vertical section through the flower shows four series of these parts. The corolla consists of an outer membranous ring, which is shallowly five lobed, each lobe radially seven-costate and plaited, each costa radially flattened on the underside and terminating in a large, triangular, acute, lacerate-margined tooth. The expansion of the flower has partly pulled out the interplait portions, showing the horizontal crumpling of the bud stage, thus giving a crinkled appearance to the outer floral ring. The corolla is tan without and tricolored within, being yellowish-tan at the margin and becoming paler toward the radially starred central ring of rose-crimson, this rose-crimson color being confined to the costae, the basal portion being white. The second series of structures is in the form of about seventy white, one-nerved flagellae, horizontally outspread upon the corolla, and may be a corona or represent an outer ring of staminodia. The third series of structures consists of forty erect staminodia which are connate for two-thirds of their length, the upper third free, the lobes slightly inflexed and much crumpled; this ring is white with a rose-crimson ring of color just above the base, and frequently with an apical spot of crimson on some of the free tips. The inner or true staminal ring is permanently inflexed, its twenty filaments free for the upper two-thirds, flattened, with an apical groove on the under side, white, with the apical portion crimson. The serial arrangement appears to be two fertile stamens alternating with two stamens bearing rudimentary anthers; the actual arrangement is five sets of four, the two outer ones of each set being fertile, the two inner ones sterile. The anthers are greenish-black, the pollen yellow. The fertile anthers are held beneath the stigmatic disk when the flower first opens, but spring above it at anthesis and remain so. The stigma is a five-angled, fleshy disk, radially five-grooved; the style thick-columnar, five-angled; the ovary completely inferior in the base of the hypanthium. The fruit is pomegranate-like, the large reniform seeds embedded in a thin pulp.

EDWARD J. ALEXANDER.

EXPLANATION OF PLATE. Fig. 1.—Flowering twigs. Fig. 2.—Vertical section of the corolla corona and the two staminal coronas × 2. Fig. 3.—Two sterile stamens and a fertile one × 3. Fig. 4.—Calyx and gynoecium × 2.

ASTER SPECTABILIS

(Plate 639)

ASTER SPECTABILIS

Low Showy Aster

Native of Coastal region, North Carolina to Masssachusetts

Family CARDUACEAE — THISTLE Family

Aster spectabilis Ait. Hort. Kew. **3:** 209. 1789.

The colored asters dominate the violet end of the solar spectrum, just as their relatives, the goldenrods and sunflowers, dominate the middle of that spectrum. The technical differences between asters and goldenrods, difficult or impossible to state in words, can in the great majority of cases be solved by the eye alone, for neither yellow asters nor purple goldenrods are known. White-rayed asters, however, are numerous among the nearly two hundred members of the genus in North America, while in only one goldenrod (*Solidago bicolor*) do the ray-flowers approach white in color. Great variety in habit exists among the asters, though the differences in technical characters frequently are slight. Yet, by the combination of habit and technical characters, the species may be sorted into a number of groups for the convenience of classification.

The plant here illustrated and described is one of four clearly associated species. The geographic range of this entire—though small—group is much more restricted than that of many other individual species. The general range includes the area from Georgia to Kentucky and northeastward to Massachusetts. However, one species—*Aster Smallii*—is known from only one region in North Carolina. The present plant has a wider range, extending through the coastal parts from North Carolina to Massachusetts, but it is apparently more abundant northward. It has recently been found in one isolated colony in western North Carolina.

The plants of this showy aster are vigorous. Frequently many stolons are produced at the base of the stem, and as these give rise to new flowering stems, each season the number of plants in a colony increases. The brilliant violet-purple heads of these low asters all lie in one plane instead of some standing very high while others remain short; thus they produce a gorgeous carpet of color in the fall. Like many plants with showy flowers, this aster naturally seeks poor soil for its habitat. Dry sand, dry oak and pine-woods, sandy pine-barrens, rocky soil, and old stony pastures are among its favorite haunts. Also like many other plants, this one can be im-

proved by cultivating it in good soil. The fresh plants give off a tar-like odor.

The low showy aster is a vigorous plant, the rootstock giving off strong stolons. The stem is stiff, one to two feet tall, simple or corymbosely branched above, often rough-pubescent below, usually closely glandular above. The leaves are firm, two to seven inches long, narrowed into slender petiole-like bases; the blades thickish, sparingly shallow-serrate, minutely pubescent, especially beneath, sometimes glabrous, the basal and lower cauline ones usually broadened upward. The heads are several or numerous, corymbose, very showy. The involucres are nearly hemispheric; the bracts linear-oblong or slightly spatulate, glandular, imbricated in about five series, the green obtusish tips lax or spreading. The ray-flowers are fifteen to thirty, the ligules bright violet-purple, one-half to one inch long. The pappus is whitish or sordid. The achenes are slightly pubescent.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Top of flowering branch × ⅔. Fig. 2 & 3.—Disk flowers ×3. Fig. 4.—Young branch from a stolon, which will give rise to a flowering branch.

PLATE 640

ADDISONIA

STIFFTIA CHRYSANTHA

(Plate 640)

STIFFTIA CHRYSANTHA

Golden-flowered Stifftia

Native of southern Brazil

Family CARDUACEAE — THISTLE Family

Stifftia chrysantha Mikan, Del. Bras. *pl. 1.* 1820.
Augusta grandiflora Leandr. Sacram. Denkschr. Akad. Muench. 7: 235. *pl. 14.* 1821.
Piazia brasiliensis Spreng. Syst. Veg. 3: 503. 1826.
Aristomenia fruticosa Vell. Fl. Flum. 8: *pl. 84.* 1827.
Mocinia mutisioides DC. Prodr. 7: 26, as synonym. 1838.

The genus *Stifftia,* a member of the Tribe Mutisieae, is represented by about seven known species, which inhabit mountains in Guiana, southern Brazil, and Patagonia, with one species reported from the Amazon region. The species appear to be rare, *S. chrysantha* being the most common and the only species frequently met with in cultivation.

Our species was first collected in the early part of the nineteenth century in the Organ Mountains of Brazil, near Rio de Janeiro. It has since been found from the State of Bahia southward to São Paulo, and has also been reported from the Patagonian Andes. It is a shrub of robust bushy habit, at length reaching a height of about nine feet. The stiff green leaves, the orange corollas crowded into large heads, and the copious pinkish-yellow pappus-hairs make this striking plant very desirable for greenhouse cultivation. Several colored plates have already been published, but all of them show the corolla brownish or yellow, whereas it actually is pinkish-orange. The specific name "golden-flowered," which refers to the effect given by the pappus, is consequently somewhat misleading.

The golden-flowered *Stifftia* is a copiously branching shrub with stiff brownish branchlets. The leaves are alternate, short-petioled, oblong-lanceolate, smooth, shining, and reticulate-veined on both surfaces, acute or attenuate at base, short-acuminate at apex, entire at margins. The heads are solitary on short branchlets, homogamous, with twenty-five to forty discoid flowers. The peduncles are short and stout, bearing a few coriaceous scales. The turbinate involucre is composed of thirty to forty imbricate coriaceous bracts which are closely appressed when young, at length spreading. The bracts vary in size, the outer ones being short and ovate, the inner ones oblong-linear. The corolla is tubular and slender, with five long narrow revolute lobes. The filaments are inserted on the corolla distally, alternating with the lobes, joined to the anthers below the middle. The anthers are two-lobed, exserted, sagittate and long-auricled at base. The style is filiform, exserted beyond the

anther tube, terminated by a bifid stigma of which the segments are equal, acute, and pilose within. The achene is essentially glabrous and slightly five-angled. The pappus consists of several rows of long, unequal, and densely setulose hairs.

ALBERT C. SMITH.

EXPLANATION OF PLATE. Fig. 1.—A flowering branch × ⅔. Fig. 2.—A flower, showing the achene, pappus, corolla, and exserted staminal tube and style.

INDEX

Bold-face type is used for the Latin names of plants illustrated; SMALL CAPITALS for Latin names of families illustrated and for the names of the authors of the text; *italics* for other Latin names, including synonyms.

Algaonema, 5
acutispathum, 5
modestum, 5, 6, *plate 611*
simplex, 5
ALEXANDER, EDWARD J.: *Azalea arborescens*, 17; *Billbergia macrocalyx*, 19; *Billbergia pyramidalis*, 33; *Boltonia latisquama*, 23; *Callistemon speciosus*, 25; *Calochortus albus*, 27; *Costus Malorteanus*, 39; *Costus Tappenbeckianus*, 15; *Ferraria undulata*, 55; *Helianthus tomentosus*, 35; *Lupinus citrinus*, 7; *Lupinus nanus*, 41; *Malachodendron pentagynum grandiflorum*, 1; *Napoleona Miersii*, 59; *Silene virginica*, 29; *Triteleia Bridgesii*, 11; *Vriesia Duvaliana*, 47
ALLIACEAE: *Triteleia Bridgesii, pl. 614*
ARACEAE: *Aglaonema modestum, pl. 611*
Aristomenia fruticosa, 63
Arum family, 5
Aster, 61
Smallii, 61
spectabilis, 61, 62, *plate 639*
Aster, 23, 61
low, showy, 61, 62
Augusta grandiflora, 63
Azalea arborescens, 17, 18, *plate 617*
Azalea, tree, 17

Begonia, 43
Adonis, 43
Amabilis, 44
Dregei, 43
Emily Clibran, 43
Emita, 43
Exquisite, 43
Fascination, 43
Gloire-de-Lorraine, 43
Glory of Cincinnati, 44
Lady Mac, 44
Melior, 44
Mrs. Clibran, 43
Mrs. Heal, 43
Mrs. Peterson, 44
Mrs. Leopold de Rothschild, 44
Optima, 43
socotrana, 43, 44, *plate 630*
Turnford Hall, 44
Viscountess Doneraile, 43
Begonia, 43, 44
Christmas, 43
family, 43
BEGONIACEAE: *Begonia socotrana, pl. 630*
Billbergia, 33
bicolor, 33
Macrocalyx, 19, 20, *plate 618*
pyramidalis, 33, 34, *plate 625*
Billbergia, 19
large calyxed, 19
pyramid, 33
Black Titi, 45
Boltonia, 23
asteroides, 23
latisquama, 23, 24, *plate 620*
Boltonia, "pink," 23
Bottle-brush, showy, 25
Bradburya hirtella, 13
Brazil-nut family, 59
Bridges' Brodiaea, 11
Brodiaea Bridgesii, 11
Brodiaea, Bridges', 11
Bromelia pyramidalis, 33
BROMELIACEAE: *Billbergia macrocalyx, pl. 618; Billbergia pyramidalis, pl. 625; Vriesia Duvaliana, pl. 632*
Bryophyllum Aliciae, 49
Buckwheat bush, 45

Callistemon, 25
lanceolatus, 25
speciosus, 25, 26, *plate 621*
Calochortus albus, 27, 28, *plate 622*
Calochortus, pearl, 27
Camellia, 59
mountain, 2
purple-stamened mountain, 2
Carapa, 51
guianensis, 51
guineensis, 51
procera, 51, 52, *plate 634*
Touloucouna, 51
Carapa, tall, 51
CARDUACEAE: *Aster spectabilis, pl. 639; Boltonia latisquama, pl. 620; Helianthus angustifolius, pl. 635; Helianthus tomentosus, pl. 626; Mauchia hirtella, pl. 615; Stifftia chrysantha, pl. 640*
CARYOPHYLLACEAE: *Dianthus Knappii, pl. 610; Silene virginica, pl. 623*
Christmas begonia, 43
Chrysopsis, 53
Cliftonia, 45
Cone-flower, 53
Coreopsis, 53
Costus, 15, 16
Malorteanus, 39, 40, *plate 628*
Tappenbeckianus, 15, 16, *plate 616*

Costus, Malort's, 39
Crassula perfoliata, 57, 58, *plate 637*
CRASSULACEAE: *Crassula perfoliata, pl. 637; Kalanchoë Aliciae, pl. 633*
Cyclobothra
alba, 27
paniculata, 27
Cyrilla, 45
arida, 45, 46, *plate 631*
parvifolia, 45
racemiflora, 45
CYRILLACEAE: *Cyrilla arida, pl. 631*

Daphne
Cneorum, 37
Fortunei, 37
Genkwa, 37, 38, *plate 627*
Mezereum, 38
Desert titi, 46
Dianthus, 3
Knappii, 3, 4, *plate 610*
liburnicus var. *Knappii,* 3
Dianthus, yellow, 3
Dwarf lupine, 41
yellow lupine, 7

ERICACEAE: *Azalea arborescens, pl. 617*
EVERETT, THOMAS H.: *Begonia socotrana,* 43; *Crassula perfoliata,* 57; *Dianthus Knappii,* 3; *Kalanchoë Aliciae,* 49

FABACEAE: *Lupinus citrinus, pl. 612; Lupinus nanus, pl. 629; Robinia ambigua, pl. 624*
Fairy lantern, 27
Ferraria, 55
undulata, 55, 56, *plate 636*
Fire-pink, 29
Flos indicus, 55
Fragrant ladies-tresses, 21, 22
Franklinia Alatamaha, 1

Ginger family, 15, 39
Gladiolus indicus, 55
Globe tulip, 27
Golden-aster, 13, 53
-flowered Stifftia, 63
Goldenrod, 53, 61
Grindelia, 53
Gum-plant, 53
Gyrostachys odorata, 21

Heath family, 17
Helenium, 53
Helianthus, 35, 53
angustifolius, 53, 54, *plate 635*
filiformis, 53
orgyalis, 53
polyphyllus, 53
tomentosus, 35, *plate 626*
Ibidium odoratum, 21
IRIDACEAE: *Ferraria undulata, pl. 636*
Iris family, 55
Iris stellata, 55
Ixia, 55

Kalanchoë, 49
Aliciae, 49, 50, *plate 633*
braziliensis, 49
Daigremontiana, 49
Fedtschenkoi, 49
tubiflora, 49

Ladies-tresses, fragrant, 21, 22
Lantern, fairy, 27
Large-calyxed Billbergia, 19
LECYTHIDACEAE: *Napoleona Miersii, pl. 638*
LILIACEAE: *Calochortus albus, pl. 622*
Lily family, 27
Low showy aster, 61, 62
Lupine, dwarf, 41
dwarf yellow, 7
Lupinus, 7
citrinus, 7, 8, *plate 612*
nanus, 41, *plate 629*
Stiversii, 7

Mahogany family, 51
Malachodendron, 1, 2
pentagynum grandiflorum, 1, 2, *plate 609*
Malort's Costus, 39
Mauchia hirtella, 13, 14, *plate 615*
Mauchia, 13
Mariposa tulip, 27
MELIACEAE: *Carapa procera, pl. 634*
MERRILL, ELMER D.: *Aglaonema modestum,* 5
Metrosideros speciosa, 25
Mezereum family, 37
Mocinia mutisioides, 63
Mountain Camellia, 2
MYRTACEAE: *Callistemon speciosus, pl. 621*
Myrtle family, 25

Napoleona, 59
Miersii, 59, 60, *plate 638*
Narcissus indicus, 55
Neottia odorata, 21

Onion family, 11
Orchid family, 21
ORCHIDACEAE: *Spiranthes odorata, pl. 619*

Pea family, 7, 31, 41
Pearl Calochortus, 27
Pineapple family, 19, 33, 47
"Pink" boltonia, 23

Pink family, 3, 29
Plazia braziliensis, 63
Purple-stamened mountain camellia, 1
Pyramid billbergia, 33

Racapa procera, 51
Rhododendron arborescens, 17
maximum, 2
Robinia ambigua, 31, 32, *plate 624*
dubia, 31, 32
hybrida, 31
intermedia, 31
pseudacacia, 31, 32
pseudacacia × *viscosa*, 31
viscosa, 31, 32
Rochea perfoliata, 57
ROSACEAE: *Spiraea nipponica tosaensis, pl. 613*
Rose family, 9
Rosin-weed, 53
Rudbeckia, 53

Showy aster, low, 61, 62
Showy bottle-brush, 25
Silene virginica, 29, 30, *plate 623*
Silphium, 53
SMALL, JOHN K.: *Aster spectabilis*, 61; *Cyrilla arida*, 45; *Helianthus angustifolius*, 53; *Mauchia hirtella*, 13; *Spiranthes odorata*, 21
SMITH, ALBERT C.: *Carapa procera*, 51; *Stifftia chrysantha*, 63
Sneezeweed, 53
Solidago, 53
bicolor, 61
Spiraea
bracteata tosaensis, 9
nipponica, 9
nipponica tosaensis, 9, *plate 613*
tosaensis, 9
Spiral-flag, Tappenbeck's, 15, 16
Spiranthes, 21
cernua, 21
odorata, 21, 22, *plate 619*
Star tulip, 27
Stifftia chrysantha, 63, 64, *plate 640*
Stifftia, golden-flowered, 63
Stonecrop family, 49, 57
Stuartia, 1
Malachodendron, 1
pentagyna grandiflora, 1
Sunflower, 53
swamp, 53
tomentose, 35
Swamp sunflower, 53

Tall carapa, 51
Tappenbeck's spiral-flag, 15, 16
Tea family, 1
TERNSTROEMIACEAE: *Malachodendron pentagynum grandiflorum, pl. 609*
TEUSCHER, HENRY: *Daphne Genkwa*, 37; *Robinia ambigua*, 31; *Spiraea nipponica tosaensis*, 9
Thistle family, 13, 23, 35, 53, 61, 63
THYMELEACEAE: *Daphne Genkwa, pl. 627*
Tickseed, 53
Tillandsia Duvaliana, 47
Titi family, 45
Titi, 45
black, 45
desert, 46
white, 45
Tomentose sunflower, 35
Tosa shimotsuke, 9
spiraea, 9
Touloucouna, 51
gigantea, 51
Tree azalea, 17
Trichilia procera, 51
Triteleia, 11
Bridgesii, 11, 12, *plate 614*
Tulip, 27

Vriesia, 47
carinata, 47
Duvaliana, 47, 48, *plate 632*
versaliensis, 47

Watsonia, 55
White titi, 45

Xylocarpus procerus, 51

Yellow dianthus, 3

ZINGIBERACEAE: *Costus Malorteanus, pl. 628; Costus Tappenbeckianus, pl. 616*